

THE RAILWAY GAZETTE

Price: Two Shillings

FRIDAY, SEPTEMBER 13, 1957

Annually £4-10s. by post



Two 85 class diesel hydraulic locomotives hauling an East African Railways goods train. Photo by courtesy of East African Railways and Harbours.

As part of their extensive development and re-equipment programme East African Railways and Harbours have selected Diesel hydraulic locomotives, built by North British Locomotive Co. The latest additions, the 85 class of 855 h.p. are fitted with Voith-North British hydraulic transmissions. Voith transmissions have been in production for over thirty years.

NORTH BRITISH

Locomotive Co. Ltd. Glasgow



machines linked for automatic transfer



This is one of the possibilities of the automatic linking of B.S.A. machines. When the requirement is for medium or high-production, on standard or special purpose machines, consult B.S.A. Tools Ltd.



B.S.A. Hüller combined mill and drilling machine for transmission boxes.



THIS 4" dia. COMPONENT MACHINED COMPLETE on a B.S.A. 5M single-spindle automatic chucking machine (for 1st opn. work) linked with a B.S.A. ACME-GRIDLEY 6" six-spindle chucking machine. After 1st opn. machining the component is conveyed via the overhead chute to the multi-spindle machine. The component is transferred to the chucks electro-pneumatically within the automatic cycle of the machines.

B.S.A. TOOLS LIMITED • BIRMINGHAM 33 • ENGLAND

SOLE AGENTS GT. BRITAIN BURTON GRIFFITHS & CO. LTD. • KITT'S GREEN • BIRMINGHAM Telephone: STECHFORD 3071



From the B.S.A. range of single- and multi-spindle automatic bar and chucking machines, thread and form generators, multi-tool and copy turning lathes, centreless grinders, broaching machines, special purpose machines and small tools.



33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1.

Telephone: WHitehall 9233 (12 lines) Telegrams: "Trazette Parl, London"

BRANCH OFFICES

GLASGOW: 139, Bothwell Street, C.2 Central 4646

NEWCASTLE-ON-TYNE: 21, Mosley Street Newcastle-on-Tyne 22239

MANCHESTER: Century Insurance Building, St. Peter's Square Central 3101

BIRMINGHAM: 90, Hagley Road, Edgbaston Edgbaston 2466

LEEDS: 70, Albion Street Leeds 27174

BRISTOL: 8, Upper Berkeley Place, Clifton Bristol 21930

Annually £4 10s. by post. Single copies, Two shillings.

Registered at the G.P.O. as a newspaper. Entered as second-class matter in U.S.A.

Editor: B. W. C. Cooke, Assoc. Inst. T.

Vol. 107]

FRIDAY, SEPTEMBER 13, 1957

[No. 11

CONTENTS

	PAGE
Editorial Notes	293
First Nigerian Railway Corporation Report	295
Training of Diesel Staff	296
Unprofessional Conduct	296
London Midland Region Winter Services	297
Danish State Railways in 1956-57	297
Aspects of Seat Reservation	298
Letters to the Editor	298
The Scrap Heap	299
Overseas Railway Affairs	300
Electronics in a U.S.A. Marshalling Yard	302
Training Diesel-Electric Maintenance Staff	304
Comparison Between Steel and Aluminium Passenger Vehicles—2	307
Personal	309
New Equipment and Processes	312
News Articles	314
Contracts and Tenders	317
Notes and News	318

INDEX

An index to the 106th volume of THE RAILWAY GAZETTE covering the issues from January 4 to June 28, 1956, has been prepared, and is now available free of charge on application to the publisher.

Wages and the Working Week

ONE of the subjects under discussion during the meeting of the executive of the National Union of Railwaymen now in progress is almost certainly the wages rates of members of the union. The negotiating committee of the N.U.R., which has been considering the amount and timing of a pay claim, was to have reported at the present meeting and may well have done so after we went to press, but no definite date had been laid down for consideration of the claim by the N.U.R. executive. The recent approach by the Transport Salaried Staffs' Association to the British Transport Commission with a request for a review of salaries may act as a spur to the N.U.R., which, with its ambitions to be the only, all-embracing, railway trade union, must show itself as working constantly for the best conditions for its mem-

bers. On the other hand, it may prudently await the Commission answer to the I.S.S.A. before proceeding further. The Associated Society of Locomotive Engineers & Firemen, which has a mandate from its members to submit a wage claim at any time, seems to be turning its immediate attention to the reduction of working hours—without loss of pay—but all three unions must have been encouraged to press for higher pay by the rejection of wage restraint policies by the Trades Union Congress at Blackpool last week. Both the A.S.L.E.F. and the N.U.R. are known to favour a 40-hr. week and have intimated that they wish to discuss this matter with the Commission. If the N.U.R. decides to co-operate fully with the Commission in holding periodical reviews of matters connected with pay, it is possible that a full-scale meeting might be held at which these problems could be discussed between the Commission and the three unions, but the A.S.L.E.F. is not committed even to considering the question of such meetings, and after their clash at Blackpool the unions may prefer to work independently.

Contracts for Indian Electrification

THE contract is recorded, on another page, for 50 Bo-Bo locomotives for the Indian 50-cycle main-line electrification, placed with the group of Belgian, French, German, and Swiss manufacturers formed for the study and promotion of this type of railway electrification; it is the first contract to be awarded under the agreement concluded between the Government of India and the French company Sofrerail, set up at the instance and through the agency of the French National Railways, by which Sofrerail has the choice of contractors for 50-cycle electrification works in India. Whilst the S.N.C.F. still has something of a monopoly of knowledge of 50-cycle techniques—though this form of electric traction was first developed in Germany—one can only admire the enterprise shown by the French authorities, and not least, it is understood, by Monsieur Louis Armand, President of the S.N.C.F., in bringing about an arrangement advantageous not only for French industry, but also for French prestige. Apart from the fact that the technique is a new one, the French firms concerned have certainly gained by the fact that 50-cycle electrification in France has afforded the advantages of an extensive home market. Meanwhile the Japanese electrical industry, which also enjoys a home market in industrial frequency electrification of the Japanese National Railways, is reported to be active in bidding for Indian contracts.

Pakistan Railways Five-Year Plan

IMPLEMENTATION of the Five-Year Plan for the Pakistan Railways, which provides for combined expenditure of Rs. 68.3 crores (about £53,000,000) on the two railways, North Western and Eastern Bengal, between April 1, 1955, and March 31, 1960, is stated by the Minister of Communications, Mian Jaffer Shah, to be progressing satisfactorily. The main emphasis in the plan is on rehabilitation of track and rolling stock, estimated to cost Rs. 56 crores, and progress in these fields has been reported in our columns from time to time. Provision has also been made for the development of workshop facilities for the assembly and manufacture of coaches and wagons and for the improvement of line capacity, which involves re-modelling of yards and installation of improved signalling. Besides conversion to broad-gauge of the narrow-gauge section between Jacobabad-Kashmor, on the N.W.R., which has been completed, several surveys for the construction of new lines on both railways have been carried out and some construction is being undertaken. Generally, however, Pakistan offers less scope for new railway building than does India, and effort is rightly being concentrated on rehabilitation.

Indispensable Information

THE 1957-58 edition, the 63rd of the "Directory of Railway Officials & Year Book," the subject of brief notice on page 301, incorporates even more information

than before; this has been achieved through typographical adjustment rather than by adding to the number of pages, so that the volume remains compact. The principal innovations are the additional details including more names of officers of the British Transport Commission and the Regions of British Railways, and Regional mileage and rolling stock particulars. In the statistical section the most drastic revision has been that of the list of principal electrically-operated railways, which has been considerably enlarged. A new article is included on the progress of diesel railway traction. The production of the "Directory" has been made possible largely through the co-operation of railway and Government administrations throughout the world. Only a handful of countries have failed to send particulars, but there are indications that they too will co-operate next year, perhaps, when it is realised how useful is this publication for all concerned with the management of, and supply of material to, railways. The new edition, despite these handicaps, is a corpus of up-to-date international railway information which we believe to be unique.

Overseas Railway Traffics

EAST AFRICAN RAILWAYS & HARBOURS approximate total railway revenue for the month of July, 1957, amounted to £1,419,000 compared with £1,387,000 in July, 1956, an increase of £32,000. This is the second month this year that revenue has been higher than that in the corresponding month of 1956. The total railway revenue for the first seven months of 1957 amounted to £9,952,000 compared with £10,154,000 for the same period of 1956, a decrease of 2 per cent, the greater part of which was attributable to the drop in receipts on the Tanganyika Central Railway Line. International Railways of Central America net revenue from railway operations in July was \$141,113 compared with \$88,054 in July, 1956, an increase of \$53,059. Aggregate net revenue from railway operations for the period January 1 to July 31 was \$1,888,575 compared with \$1,935,891 for the corresponding period of 1956. Canadian Pacific Railway revenues for July were \$42,434,848 (against \$43,098,211 for July, 1956) and railway expenses \$39,387,635 (\$39,418,486), so that net earnings were \$3,047,213 (\$3,679,725). Operating revenues of the Canadian National Railways for July amounted to \$64,764,000 (\$67,797,000). Expenses, taxes, and rents totalled \$65,345,000 (\$61,290,000), resulting in a net operating income deficiency for the month of \$581,000 (\$6,507 surplus).

Brazilian Southern Trunk Line

THE Federal Government of Brazil has earmarked funds for continuation of work on the Principal Southern Trunk Line (T.P.S.), which is expected to be completed by 1965. The object of the new line is direct broad-gauge (5-ft. 3-in.) communication between the Federal District (Rio de Janeiro), Sao Paulo, Curitiba, and Porto Alegre and Rio Grande, in the south of the Federation, reducing the rail distance from Rio to the southern extremity of Brazil from over 1,600 to some 1,200 miles. It will link the Central Railway with the Sorocabana, Parana-Santa Catarina and Rio Grande do Sul systems. The new line will include fewer steep gradients and sharp curves than does the existing circuitous metre-gauge route to the South. Railway staffs are laying the northern sections, but railway construction troops are working on the line further south. No information is available as to the motive power it is planned to use, but traffic presumably will not justify electrification of the southern portions of the new railway.

Machine Tool Production

THE recent official Labour Party declaration that it is considering the nationalisation of parts of the machine tool industry, and that the progress of automation in Great Britain has been seriously limited by the slowness of the industry to adjust itself to the new

demands, makes examination of the June statistics for machine tool orders and deliveries more than usually interesting. Deliveries in June, with a value of £7,480,000, were well below the £8,520,000 recorded for May, but were much higher than the £6,300,000 for June, 1956. Home orders during the month amounted to £4,560,000, and export orders to £1,720,000, in both categories rather less than in June last year. The fact that deliveries are running at a much higher rate this year makes it difficult to compare the state of the order book. This stood at £105,230,000 at the end of June, 1956, and was £90,120,000 at the end of June this year. Much of this decline is the result of higher output and a consequent working-off of the backlog of orders. In June, for example, deliveries were £1,200,000 more in value than new orders.

New Zealand Railways Losses

A LOSS of nearly £5,000,000 was incurred by the New Zealand Government Railways during the year 1956-57. There was a working loss of £269,373, without provision for £4,650,654 interest payments. In the previous year the railways showed a working surplus of £1,400,000, but still sustained a loss after interest charges were deducted. Interest payments last year rose by slightly more than £1,000,000. Revenue for the year 1956-57 rose by more than £500,000 mainly as the result of a 10 per cent increase in fares and an 8 per cent rise in freight charges. Included in the general loss was £37,315 deficit incurred by the N.Z.G.R. road services; in 1955-56 this branch achieved a surplus of £67,000. The only railway activities to show a surplus were the bookstalls and the advertising service; the amount in both cases was small. There is reason to believe that efforts being made by the management to achieve economies and increase productivity will bear fruit. It is to be hoped that they will not be nullified by wage increases and other rises in outgoings.

Main-Line Diesel Working in New Zealand

CONSIDERABLE operating economies are stated to have resulted from main-line diesel haulage in New Zealand. A report tabled in the House of Representatives states that in the North Island diesel-electric main-line locomotives hauled during the year ended March 31, 42 per cent of the freight gross ton-miles, more than double the amount hauled in the previous 12 months. During the last four weeks of the financial year, 49.3 per cent of the freight gross ton-miles in the North Island was diesel worked. Diesel power has proved to be particularly effective on the many gradients and, compared with steam operation, it has enabled traffic to be handled by fewer trains, and much reduced journey times, with consequent improvement in wagon turnaround. On the difficult North Island main trunk route between Wellington and Auckland, the earlier periodic accumulations of tonnage at key points have been eliminated. Goods trains now climb the very steep Spiral line from Raurimu to National Park, seven miles, in 20 min. with loads of 640 tons, against 35-40 min. and loads of 580 tons with steam haulage.

Fast Run on the West Coast Route

THE run of the up "Caledonian" from Carlisle to Euston on September 5, when the 299.1 miles were covered in 4 hr. 14 min., at an average speed of 70.6 m.p.h., shows what will be possible on the West Coast main line after electrification between London and Crewe, and with diesel haulage north thereof—or perhaps with diesel haulage throughout between Euston and Glasgow. Last week's run, with an arrival 37 min. early in Euston, after a punctual start from Carlisle, was an effort on which all concerned are to be congratulated. Some details are given on another page. For obvious reasons, however, frequent runs of this kind with timetable trains are undesirable, and it is to be hoped that inter-Regional rivalry will not lead to a revival of the races to Scotland at the end of the last century. On the other hand,

occasional very fast runs are a stimulus to mechanical and operating staffs, and serve a useful purpose if they result in appreciable improvements in the timetables. There is scope for healthy rivalry between Regions in accelerating and otherwise improving the Anglo-Scottish passenger services; some such amelioration is already apparent in the winter timetables.

Electronics at Swindon

WITH the inauguration at Swindon last week by Mr. R. F. Hanks, Chairman of the Western Area Board, of the first electronic computer to be used on British Railways—and, indeed, the first of its type to be put in use anywhere in the world—British Railways are beginning to reap the advantages of electronics applied to accounting. The new machine will deal with the pay of some 10,000 employees at Swindon and enable the paybill staff to be reduced from 100 to 60. This particular machine is rented to British Railways by Powers-Samas, the manufacturers, but even if bought outright at its cost of £20,000, the computer would quickly pay for itself as it is expected to make possible a net annual saving of £10,000. The fact that the machine works in conjunction with a punched card system already in wide use on British Railways enhances its value, for its complicated functions are more easily understood by staff trained in these procedures. The value of this computer will not necessarily be restricted to paybill compilation alone. Its application to other fields of railway work is being studied and all possible use will be made of its capabilities.

Shortage of Sleepers in India

IN almost 50,000 miles of track operated by the seven railways in the Republic of India there are not far short of 100,000,000 sleepers, the renewals of which is causing the Railway Board increasing anxiety. The estimated quantity of suitable timber for sleeper replacements during the next five years is about 19,000,000 cu. ft. a year. Hardwoods are now prohibitively costly for ordinary permanent way, but pressure creosoting plants are installed at Naharkatiya in Assam, Clutterbuckgunj in the United Provinces—Indian Railways still adhere to this name—Dhillwan in Eastern Punjab, Ollavakkot in Madras and Bhadravati in Mysore, capable of treating softwood sleepers. Unfortunately, a shortage of creosote is limiting their capacities, and the supply of even secondary species of timber is inadequate, being only about a third of the quantity required. Despite high freight charges, timber is having to be ordered from Burma, Malaya, Siam, and Australia to supplement indigenous supplies, but even with steel, iron and concrete sleepers—also scarce and costly—only 60-70 per cent of the minimum requirements are available.

A Combination of Defects

THE derailment at Droylsden on November 22, 1956, unattended by harm to passengers, took place at the end of a short section of track which for many years had proved particularly difficult to maintain in satisfactory condition and was known to require constant attention. Brigadier C. A. Langley inquired into the case and his report is summarised elsewhere in this issue. The driver was in no way responsible for what occurred. An experienced ganger, in carrying out instructions to remedy one bad condition created another which, combined with undue sideplay in the axles of the engine tender, led to its right-hand leading wheel crossing the high rail at the trailing end of a crossover road, just in rear of junction facing points, the engine itself and some coaches being pulled off the track in consequence. Brigadier Langley recommends drawing attention generally to the importance of using the cant gauge and not judging levels only by the eye, that arrangements be made in all Regions for keeping tender axle sideplay within bounds and for weighing engines whenever work done on them is liable materially to affect the wheel loading.

First Nigerian Railway Corporation Report

THE report for the six months to March 31, 1956, is the first to be issued by the Nigerian Railway Corporation, which took over the Nigerian railway undertaking on October 1, 1955. It is also the first to be signed by Sir Rali Emerson as Chairman of the Corporation. The process of transfer involved extensive investigations to determine the value of the assets and the extent of the liabilities of the undertaking. The net value of assets, less liabilities, was found to be of the order of £50 million.

An agreement in principle, at the time of the report, between the government and the Corporation provided that the amount of compensation should be £25 million, to be satisfied by the issue of Nigerian Railway Stock to a nominal value of £25 million. This consists of £4 million Nigerian Railway "A" stock, carrying a fixed interest of $4\frac{1}{2}$ per cent a year on which an annual payment of 1 per cent of the nominal amount is to be made for 41 years, when the stock will be deemed to be extinguished. The balance consists of £12 million "B" stock, carrying a fixed interest of $4\frac{1}{2}$ per cent a year, redeemable at the Corporation option on terms to be agreed between the government and the Corporation, and £9 million variable interest stock carrying interest of $4\frac{1}{2}$ per cent a year provided that the interest payable in any one year shall not exceed 30 per cent of the profits of the Corporation for that year in excess of £750,000, calculated after deducting "A" and "B" stock interest, redeemable at the Corporation option at any time after the "B" stock has been redeemed, on terms to be agreed. The value of assets is some £24 million more than the amount of compensation and this sum has been placed to a general capital reserve. Subject to certain special provisions, the Corporation is liable to income tax, from which the Government Railway was exempt.

Operating revenues reached the record figure of £7,127,000 for the half-year. The advance in passenger train receipts to £941,000, much the best figure in the history of the railway, is attributed almost entirely to the success of the drive against ticketless travel. The annual improvement as a result of this drive is expected to be at least £300,000. Freight receipts, at £5,981,000, were more than £500,000 higher than in the previous half-year. As may be seen from the article in our issue of May 24 last, dealing with 1956 as a whole, these improvements continued throughout the year.

The following table gives some of the principal results for the half-year, but changes in the form of accounts may mean that the financial figures are not strictly comparable:—

	Six months to September 30, 1955	Six months to March 31, 1956
	(thousands)	
Passenger journeys	2,735	3,575
Tonnage hauled (paying)	974	1,026
Passenger train-miles	312	276
Mixed train-miles	536	598
Goods train-miles	2,271	2,427
Departmental train-miles	80	101
	(£ thousands)	
Passenger, parcels, and mails receipts	755	941
Goods and livestock receipts	5,427	5,981
Road transport receipts	61	66
Total operating receipts	6,337	7,127
Operating expenditure	4,248	4,875
Operating surplus	2,089	2,252
Interest on capital	451	493

A traffic survey, supplementary to the original Bornu extension survey, was commenced at the end of 1955. This was undertaken to give more detailed consideration to various alternative routes for the extension. The routes considered were: route B, Lafia-Maiduguri; route B1, Shendam, Gombe, and Potiskum; route B2, Shendam, Gombe, and Potiskum Road; route B3, Shendam, Gombe, and Biu Road; route D, Kuru to Maiduguri via Gombe and Biu Road; and route D1, Kuru to Maiduguri via Bauchi. A preliminary engineering reconnaissance was carried out along the alternative routes.

The freight net ton-mileage figure of 603,541,000 was an increase of 7.9 per cent on that for the first six months of the year and the average length of haul per paying ton rose to the record figure of 507 miles. The last three of

10 diesel-electric 750-h.p. Bo-Bo English Electric locomotives were placed in service and enabled diesel traction to be extended to the Zaria-Kaura Namroda branch as well as the Zaria-Kano service. Substantial increases were recorded in all classes of passenger travel. Third class passengers increased from 2,835,906 in the first half-year to 3,532,434. Much of this increase was the result of ticket checking activities. Significantly, perhaps, the only fall in miscellaneous receipts was £244 for platform tickets. The total revenue earning tonnage moved in the half-year was 1,025,498 tons, 10,000 tons more than in the corresponding months of the previous year.

New vehicles placed in service included 35 covered wagons, three low-sided wagons for the engineering department, 50 high-sided wagons, 20 cattle wagons, and 12 motorcar vans. All these, except the motorcar vans, are bogie vehicles and all are vacuum braked. Coaching stock placed in service included 10 third class and six brake third class vehicles. There were also 10 inspection coaches and eight bunk-fitted vans. On March 31, 1956, 394 coaches and 4,482 wagons were available for main-line work and all except 411 piped vehicles had vacuum brakes.

The Nkalugu cement works branch was completed and opened and work continued on the Kafanchan-Jos line bridges to bring them to the standard 12½-ton axle-loading capacity. Major signalling installations were completed at Lagos Terminus, Ebute Metta Junction (South), Kano, and Jos. Selective control telephone equipment was provided at the 31 stations between Port Harcourt and Enugu.

Training of Diesel Staff

UNLIKE the steam locomotive which it displaces, the diesel locomotive, particularly when it incorporates an electric transmission system, is made up of a variety of sensitive and complicated equipment moving at high speeds. Because of this, extreme care is required in the maintenance and operation of diesel-electric motive power to ensure its correct functioning and prevent accidents which could be very serious. The steam locomotive, on the other hand, although of poor thermal efficiency, is a robust piece of machinery which can stand a good deal of mishandling and abuse by both footplate and running shed staff, which allows of the employment of relatively inexperienced and unskilled men on the footplate and in the shed in certain circumstances without any great risk of damage to the engine. Obviously the provision of adequately trained maintenance and operating staff is an essential requirement to the acquisition of diesel-powered stock as a replacement for steam motive power. The problem has been and still is being tackled by railway administrations all over the world in varying degrees of thoroughness, no doubt dictated by local conditions.

In this country, the training of such staff categories is generally on a Regional basis and, as such, the method and degree of training vary accordingly. Elsewhere in this issue we publish an article describing the scheme which has recently been put into operation by the Southern Region of British Railways for the training of diesel-electric fitters, with particular reference to the newly-introduced six-car London-Hastings (via Tunbridge Wells) multiple-unit sets, described in our May 10 issue, and the two-car multiple-unit sets intended for operation on certain lines in the Hampshire area, which were the subject of editorial comment in our issue of August 9; some of these latter services commence operation next week.

One of the items used for training which was developed specially by the Region is a demonstration panel which simulates the operation of the load control equipment of the engine-generator and traction motors, with the associated contactor and relay contacts. The face of the unit, which is termed an operation simulator, carries a schematic diagram of the load control and traction circuits and incorporates rotating discs, representing the armatures of machines, with coloured lamps in place of relay and contactor contacts, as well as controls and indicators found in the cab of the parent equipment including a traction

ammeter, speedometer and controller. The various components are designed to function so as to produce the same or similar effect as on the parent equipment. Also by means of a fault switch panel, the instructor can demonstrate a fault, and explain its effect on the parent equipment. Such a demonstration unit should prove invaluable in the training of staff on the complex equipment which is involved in diesel-electric transmission, and the Southern Region is to be congratulated on what is probably the first unit of its kind to be made and used by a main-line railway in this country.

The idea of using training equipment which simulates the operation of a complex piece of machinery, with which staff must be familiar, so as to ensure proficiency and thoroughness of training, is, of course, not new; other industries and services have made and still make use of such equipment. An example which comes to mind is that of the Link trainer, used extensively in the Royal Air Force for the training of pilots; that Service has also made use of other demonstrative equipment for testing and training other aircrew categories, such as flight engineers, in fault finding and the correct operation of engines, controls and so on, with which they are particularly concerned.

Railway officers no doubt are aware that such other similar branches of engineering can offer many ideas which can be incorporated with advantage into railway engineering methods as well as training schemes; methods of training adult personnel, of ensuring adequate absorption and retention of the knowledge acquired, and systems of regular maintenance and overhaul arrangements are a few examples. Also, a type of regular refresher course is used by some railway authorities for drivers and shunters besides shed staff but not, as far as we are aware, in Britain.

The various training schemes for diesel operating and maintenance staff in each of the Regions are creditable, but it is for consideration whether steps are being taken to ensure fullest use of the instructional facilities available. There is a very real problem of giving adult staff—particularly those who were formerly engaged with steam locomotives where little, if any, theory is required or necessary—adequate tuition in the use of equipment which requires a more theoretical and scientific approach. This may well be a major factor on which realisation of the maximum economies to be expected from the conversion to diesel traction in this country will depend.

Unprofessional Conduct

IN making a claim, it is believed for the first time in railway history, for payment for overtime and Sunday work for staff who are above Special Class category and in receipt of salaries of up to £2,230 a year, the Transport Salaried Staffs' Association has done itself little good—except perhaps in the eyes of some of its members who consider that such action shows their union to be forceful and vigorous. On the contrary, the union has taken a step which must lower the status of those who are now covered by the claim, in the eyes of other railwaymen—only lessened by the fact that many in the wages and clerical grades are very well aware that their own chiefs, whom they know personally, would never dream of asking for overtime payment, despite the long hours of devoted work they put in—and are respected accordingly by their subordinates.

Whatever may be the position with the wages and clerical grades, on whose behalf their unions, rightly, in many cases, make claims for overtime, those in senior positions are not expected to think of their work in such terms. Many of the men on whose behalf the T.S.S.A. has claimed overtime payment are civil, mechanical, or electrical engineers, members of a recognised profession to which the approach to work implied by demands for overtime must be abhorrent; and the same principle applies to many employed in operating or in railway accountancy or commercial work, who may equally well regard themselves, with pride, as members of a profession—railwaymen.

The idea of overtime and Sunday payments, and of the

totting up of hours worked that they involve, is anomalous in the case of those whose responsibilities never cease, except on their holidays. There is prevalent today an egalitarian tendency, not only a desire to minimise the status and remuneration of those holding senior appointments, and to disparage the force of character, ability, and experience that have brought them to their positions, but also an assumption that they share the lack of ideals which egalitarians tend to attribute to all men. Nevertheless nobody in a responsible position can be expected to work satisfactorily if his remuneration is insufficient. That railway officers and supervisors ought not to think in terms of hours worked does not mean that they should be underpaid. Their remuneration has been increased in recent years, but still not to a level, in most instances, which compares reasonably well with that of men occupying positions of comparable responsibility in other walks of life.

London Midland Region Winter Services

IT is a tribute to the careful and practical planning of the completely reorganised Midland Division timetable introduced in June last that, notwithstanding the very substantial accelerations and the tightness of many of the point-to-point timings, the main line services are being continued almost without alteration for the winter. Moreover, most of the fastest "XL Limit" timings are to operate on Saturdays as well as the other weekdays, two down and three up expresses only being given slightly easier timings for load reasons. The deficiency in refreshment facilities on certain trains, to which we drew attention in commenting on the summer service, is remedied by providing buffet cars on the 2.25 p.m. from St. Pancras to Manchester (as far as Derby), the 3.15 p.m. to Bradford (to Sheffield), the 7.25 a.m. Manchester to St. Pancras (from Derby), and the 8.34 a.m. (previously 8.33) from Sheffield to St. Pancras. But the 6.50 p.m. from St. Pancras to Manchester remains without any such facility, passengers wishing to dine having to take the 6.33 p.m. down and change at Leicester or Derby.

Among minor changes, to meet complaints arising out of the lengthy gaps in the down evening business services from St. Pancras caused by the departure of the 6.33, 6.42 and 6.50 p.m. expresses, the 6.50 p.m. down Manchester express is to call at Luton, and the 6.55 p.m., originally non-stop to Luton, at Harpenden in addition to the St. Albans stop which was introduced by special notice during the summer. In the up direction, the 12 noon from Bradford to St. Pancras is being accelerated 10 min. by the omission of the Luton stop, and is booked over the 49.8 miles from Bedford to St. Pancras in 50 min.—the fastest time ever yet scheduled between these points—arriving at 4.57 p.m. A new express leaves Luton at 4.34 p.m. for St. Pancras only, due at 5.7 p.m., and another new train is the 5.50 p.m. from Bedford, calling at Luton, Harpenden and St. Albans and reaching St. Pancras at 7.7 p.m. In the reverse direction a new morning facility is the 7.15 a.m. from St. Pancras to Luton, calling only at Mill Hill and arriving at 8 a.m., which will be of considerable benefit to workers in the Vauxhall motor plant.

In the Western Division the principal innovation is the introduction of diesel multiple-unit workings between Crewe, Stoke-on-Trent, Uttoxeter and Derby, on an hourly even-interval basis. Departures from Crewe are at 20 min. past the hr. from 7.20 a.m. to 8.20 p.m.; the only exception is 3.30 instead of 3.20 p.m., and this train is a through diesel working from Llandudno at 1.45 p.m. to Derby, arriving at 4.46 p.m.—one of the most lengthy continuous workings in the country of one of these diesel sets, and 70 min. quicker overall than the previous steam service. Times from Crewe to Derby vary mostly between 76 and 87 min., according to the number of intermediate stops. The sweeping improvement of this service is seen in the fact that there will now be 14 daily trains from Crewe to Derby taking an average of 85 min. on the run, as compared with seven only last winter taking an average

of 111 min.—an increase of 100 per cent in trains and a reduction of 23½ per cent in journey time.

In the reverse direction departures from Derby are mostly at 15 min. past the hr., but the 8.20 and 10.30 a.m., 12.35 and 5.55 p.m. (the last in place of 6.15 p.m.) are variations. The 8.15 p.m. is the last hourly departure from Derby in the evening, and there is also a 9.50 p.m. The 9.15 a.m. from Derby is used to form the 11.15 a.m. from Crewe to Llandudno, booked over the 26.5 miles from Chester to Prestatyn in 26 min. start to stop, and providing a new and fast connection out of the 7.55 a.m. from Euston to Rhyl and Llandudno, reached at 1.4 p.m. The mile-a-minute booking mentioned is the first to be scheduled in this country with a diesel multiple-unit train. There are additional local workings between Uttoxeter, Creswell, Stoke, and Derby, and the number of diesel multiple-unit workings in the Manchester-Crewe-Stoke area also is being increased.

On the Western Division main line the Crewe stop introduced by special notice during the summer into the non-stop Carlisle-Euston working of the 3 p.m. "Midday Scot" from Glasgow becomes permanent, and the Euston arrival is therefore at 10.30 p.m. instead of the 10.20 p.m. of the summer timetable. Through coaches and sleeping cars to Inverness are provided by the 7.30 p.m. from Euston on Saturday nights, and in the up direction by the 5.5 p.m. from Inverness on Sundays, so, with the "Royal Highlander" on other nights, providing through service throughout each week. There are no other changes to remark, and in particular nothing has been done to improve the indifferent service between the Lancashire cities and Scotland, still limited to one morning and one evening through service in each direction between Manchester and Liverpool and Glasgow, taking from 5½ to 6 hr. for a journey of 220 to 223 miles. The wait of the 3.45 p.m. Manchester express at Nuneaton for 17 min. to allow the down "Caledonian" to pass is another timetable weakness calling for remedy.

Additions to named trains are the Manchester portion of the highly popular 7.55 a.m. from Euston, which revives the name "Lancastrian" carried up to 1939 by the 6 p.m. down (now the "Mancunian"); the up "Lancastrian" is the 4.5 p.m. from Manchester to Euston via Stoke. On the Midland Division the new 7.55 a.m. from St. Pancras to Manchester becomes the "Palatine"—another pre-war name resuscitated—and the corresponding up working is the 3¼ hr. 2.25 p.m. from Manchester, the fastest up train of the day.

Danish State Railways in 1956-57

AN increase during the year ended March 31, 1957, of about one per cent in the number of passengers carried by the Danish State Railways, of which Mr. P. E. N. Skov is General Manager, occurred entirely in the Copenhagen suburban area, where 74,600,000 passengers were conveyed, compared with 73,300,000 the preceding year, and was combined of a considerable increase for season and weekly tickets and a slight decrease in ordinary tickets. The number of tickets sold to or from foreign countries increased from 2.5 million to 3 million, the increase being mainly in tickets sold from Sweden to Denmark. Otherwise there was a falling-off in traffic caused by the rapid increase in motorcars, motorcycles, scooters, and autocycles.

Some of the results for 1955-56 and 1956-57 are:—

	1955/56	1956/57
Km. open	2,792	2,779
Passengers (millions)	106.9	107.8
Goods (million tonnes)	6.52	7.15
Train-km. (millions)	38.2	38.6
Operating ratio	104.2	105.7
Million kroner		
Passenger receipts	246.9	241.0
Freight	167.6	177.3
Gross (all services)	493.8	506.9
Working expenditure	514.7	536.1
Net deficit	20.9	29.2
Deficit after charges	79.2	81.9

Freight traffic was up by nearly 10 per cent, but a comparison is not easy because the severe winter in the

first months of 1956 caused a considerable reduction in traffic in February and March, especially across the Great Belt which was partly closed for a time, and part of the traffic thus held up came in the new financial year. Freight traffic to and from other countries increased about 18 per cent.

Despite a reduction in staff of about 500, expenditure on wages and salaries shows a rise of 13·8 million kr. because of increases authorised in April and October, 1956. The result is that the increased gross receipts were more than counterbalanced by increased expenditure, the net deficit rising to 29,200,000 krone.

Of the 38·6 million train-km., diesel traction accounted for 24·4 million, an increase of about 20 per cent over the preceding year, the result of placing in service new diesel-electric locomotives. The economies in operation obtained by these locomotives were largely offset by rising fuel prices. Steam traction now only accounts for 9·9 million train-km., a reduction of 27 per cent.

The ferry service is still growing. The 25 ferries and other ships made 43,500 round trips. On the important Great Belt crossing between Korsør and Nyborg (16 miles) over 44 round trips were made a day on an average; and by this route were carried 614,000 motorcars, 4,738,000 passengers, 38,200 railway passenger vehicles and vans, and about 360,000 freight vehicles. State railway bus routes have now been running 25 years and are still growing in number and traffic. In 1956-57 the 537 buses carried 23,600,000 passengers.

Aspects of Seat Reservation

(By a correspondent)

ALTHOUGH the raising of the standard second class fare on British Railways to 2d. per mile was an eventuality only to be expected, the announcement that the seat reservation fee is to be increased shortly to 2s. may come as a surprise to a travelling public which is accustomed to paying 1s.—the charge since systematic reservation of individual seats was first introduced by the Great Western Railway in the "Cornish Riviera" in 1905. It may be asked whether the 1s. fee, even though long unchanged, is economic. The seat reservation facility is, deservedly, well used, and the revenue from bookings on only one train may often cover one clerk's salary for a week. Seat reservations require the services of a comparatively modest number of staff, allowing for labelling up of seats, uniformed platform attendants, and so on. A further economy of labour is achieved when "All seats reserved" notices are used for fully-booked compartments, and sometimes for coaches. Even although the revenue from the 1s. charge is now barely equal to costs, the possibility of improved methods leading to economies, it might be maintained, would be preferable to increasing the charge. These methods might be achieved by mechanisation of clerical work, or by work-study techniques.

The railways' competitors in journeys of between 50 and 500 miles, the motorcoach and air liner, quite apart from the private car, all provide a guaranteed seat at the time of booking, and no extra charge is made for this. It may be asked what will be the effect of increasing the reservation charge to 2s. For journeys up to 120 miles at the new scale of fares, assurance of a seat will in future cost 10 per cent or more of the fare paid. One suggestion is that the charge should vary, say, between 1s. and 2s., according to the distance travelled, with a 2s. fee for over, say, 150 miles. Advocates of this proposal maintain that it would be reasonably straightforward to administer. That is doubtful; the Southern Railway, however, before the war, reserved seats in London at varying charges in different boat trains from French Channel ports in connection with its steamer services. The varying charge would certainly result in anomalies. Thus the 1s. fee would be chargeable in London-Birmingham-Wolverhampton trains, but 2s. in those from London to Lanca-

shire; a passenger for Rugby would be liable for a different charge according to the train selected; but in such a scheme, short-distance passengers would be discouraged from using the longer-journey trains, and possibly overcrowding them. Journeys from London to the East Anglian and South Coast resorts, it might be argued, cannot justify a 2s. charge. Varying from 50 to 100 miles, many are made by holidaymakers and their families, and, as an example, parents with three children would have to find an extra £1 to ensure seats for their round trip. For some journeys to the South Coast, it will, in fact, be no more expensive to travel in the Pullman. Complexity, however, appears to be an overwhelming objection to a double scale of fees. If the increase in the fee led to a diminution of reservation bookings—which is doubtful—apart from the resultant loss of revenue, a valuable advance indication of train-loadings would be lost. Furthermore, seat bookings at peak periods are desirable as they can be used to ensure a more uniform loading of trains.

A facility which is badly needed is the ability to make a reservation for the return journey at the same office, and at the same time, as that for the outward trip. This would require the making of block allocations of seats to principal offices—actual experience would soon show just how large these should be—and such facilities have been possible for many years for steamer berth bookings, and so on. In addition, valuable time would be saved by the traveller and to some degree by the clerical staff concerned.

The question of the number of seats—three or four a side—in second class side-corridor compartments is complex. Many people experience the unnecessary discomfort of having to stand in the corridor while one-quarter of the seating space in such compartments is not used to capacity when seats are reserved on a three-a-side basis. If three-a-side seating is to be maintained in the first class carriage, the desirability of limiting second class seating also to three-a-side is questionable commercially. A fixed armrest dividing seats in second class compartments into two plus two would ensure the passenger just as much seat space as is available in a centre-gangway coach. If, however, the movable armrest is to remain, the possibility of incorporating a simple device which would enable it to be locked up out of the way at weekends and peak periods, might be considered. It would be expensive to instal, but might pay for itself eventually, by ensuring full use of seating accommodation.

Letters to the Editor

(The Editor is not responsible for opinions of correspondents)

Station Gardens

September 2

SIR,—I have recently had the great pleasure of inspecting the station garden at Goldsborough (Yorks), near Knaresborough. This is quite the finest I have ever seen anywhere and reflects the greatest credit on those responsible—not least for the imaginative notice on the nearby level-crossing gates inviting passing motorists to inspect the garden.

The British station garden is a potential source of goodwill by no means fully exploited. I would like to suggest the following measures: (a) Excursion trains—using diesel railcars—for the public to view station gardens and possibly to assist in the judging; (b) invite public assistance in the way of contributions of plants and so on, thus encouraging a feeling of "our station"; (c) making outstanding station gardens the subject of a series of posters; (d) publication of an annual coloured brochure showing the outstanding station gardens of the year and available to the public at a small charge.

Yours faithfully,

WILLIAM B. STOCKS

22, Heatherfield Road, Marsh, Huddersfield

THE SCRAP HEAP

Scrap Locomotive Runs 1,000,000 km.

A Peking newspaper records that a locomotive built up by railwaymen from parts from a wrecked locomotive, and named *Mao Tse-tung*, has achieved a national record for China by running 1,000,000 km. without a breakdown.

Or Else . . . !

A liquor licence has been granted to the restaurant car on the Tanga Line. Two of the conditions of sale imposed by the licensing authorities are as follows:—

(a) Suitable and separate sanitary accommodation to be provided for male and female patrons; and (b) the sanitation mentioned in (a) above to be water borne, connected to a septic tank installation or to the public sewer.

. . . Septic licence of course.—*From "East African Railways & Harbours Magazine."*

Ambition Realised

Even as a passenger on the footplate it was impossible not to share in the feeling of power. Seated in the fireman's position I had in front of me a duplicate regulator handle and—more enticing still—a duplicate lever to control the siren. *Mallard* has a particularly impressive two-toned siren that also gives off a fine plume of steam. It was only as we were nearing Edinburgh that I plucked up courage to ask. Yes, I could. Driver . . . agreed, and loud over the wayside village of East Fortune, East Lothian, howled the greetings of the *Manchester Guardian*. . . .

Within four or five years the big Edinburgh expresses will be hauled by clinically efficient diesel locomotives.

Mallard . . . and her kind will be relegated to express goods trains. . . . I am glad to have been part of her if only for six hours before she becomes a museum piece.—*From "The Manchester Guardian."*

Royal Journey (1857)

The Queen, the Prince Consort, and the Royal Family and suite will leave London for Scotland to-morrow morning by a special train from King's-cross Station at 8 o'clock . . . The line and stations are to be kept clear half an hour before the time the Royal train is due, and all traffic is to be stopped until the Royal train and the pilot engine following shall have passed. . . . The communication between the guard and engine-driver will be used on this occasion, and a man will be stationed on the tender to take cognizance of signals.—*From "The Times," of August 27, 1857.*

Historic Relics at Yatton

An earth-encrusted medallion, recently dug up on his allotment at Yatton, Somerset, by a Western Region driver, has been identified as a souvenir struck to commemorate the launch at Wapping Dock, Bristol, on July 19, 1843, of the s.s. *Great Britain*, the first iron ship built, and the first screw-driven steamer to cross the Atlantic.

The medallion depicts on one side the *Great Britain* with the principal dimensions—322 ft. long and 50 ft. 6 in. main breadth. The other side of the medallion bears a portrait of the Prince Consort, who performed the launching ceremony, after travelling from Paddington to Bristol by special

train accompanied by I. K. Brunel, who was both Engineer of the G.W.R. and designer of the *Great Britain*.

The allotment where the medallion was found is near Yatton engine shed and close to the main line from Bristol. A uniform button of the old Bristol & Exeter Railway, amalgamated with the G.W.R. in 1876, was found on the same spot not long ago.

The medallion is being considered for preservation by the British Transport Commission, but it is doubtful whether the grime which obscures much of the inscription can be removed without damaging the surface.

Train Meets Seal

A [New Zealand Government Railways] train from Bluff to Invercargill met an unusual obstruction on the line in the form of a seal. The seal had apparently come up a nearby river or creek and was in a cutting near the Awarua radio station. The train stopped to allow the seal to take up station on the side of the line, and then carried on. Last glimpse passengers had of the animal was as he flopped his way along the line towards Bluff.—*From the "Evening Star" (Dunedin).*

Winter Train Services

With British Railways trains, one must remember,

Winter begins somewhere in mid-September;

Summer has gone—its brief itinerary Has made small impact on the memory, Save, to be sure, for record-breaking trains,

For fitful sunshine and for winds and rains.

Some branch lines will record a curious hum,
Denoting that the diesel's day has come,
And inter-city travel will be slicker,
Getting us here to yon and back much quicker,
Whilst, come what may elsewhere upon the earth,
"The Fair Maid" will be going back to Perth.

One wonders if, like Bizet, one

B. Britten
May find himself melodically smitten
Enough to celebrate, with music's aid,
This latest incarnation of "The Maid."

But all this presupposes, as you know,
Benevolence from fog and ice and snow,

The lack of tidings in the booking hall
Of late arrivals or of none at all.
In fact, as usual about this time,
A pessimistic outlook is a crime.
If winter comes, as come it will, one day,

Sooner or later it will go away.
Emulate, then, the train-time planners' zest

And, like them, go on hoping for the best!

A. R.

Far from East Anglia



Photo]

[F. Merton Atkins

Former Midland & Great Northern Joint Railway van seen several times recently at Victoria, Southern Region; it retains its M.G.N. livery

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AUSTRALIA

New Standard-Gauge Line

The first coal train hauled by two diesel-electric locomotives left Leigh Creek recently for the Power House at Port Augusta, running over the Commonwealth Railways new standard-gauge line which will now take the traffic formerly worked over the Central Australia Railway.

At Stirling North, a few miles from Port Augusta, the coal trains are diverted to the power house branch and the coal is discharged by tippler on arrival there. Before completion of the standard-gauge line the coal arrived at Port Augusta by "piggy back" train in 3 ft. 6 in. gauge wagons carried on standard-gauge flat trucks.

The standard-gauge line was built to obviate using the 3 ft. 6 in. gauge Central Australia Railway, on which coal was brought to Quorn and then across to Port Augusta through the Pichi Richi Pass, a winding, mountainous route.

The capacity of the 3 ft. 6 in. gauge line was insufficient for the greatly

increased quantities of coal required at Port Augusta by the Electricity Trust of South Australia.

Double-headed diesel-hauled trains on the new line each carry as much as seven of the old 3 ft. 6 in. gauge trains, which consisted of a steam locomotive and 40 wagons. Travelling time is now about 8 hr. compared with 15 hr. or more previously.

NEW ZEALAND

New Station for Porirua

Development of a city of 32,000 people centred on Porirua, 11 miles north of Wellington, is planned by the Ministry of Works. Already, the growth of population at Titahi Bay, near Porirua, has been rapid, with resultant increased pressure on suburban train services to Wellington. Doubling between Tawa Flat and Porirua as a first step in eliminating the single-line bottleneck between Tawa Flat and Plimmerton is now well advanced, and double line to the south end of Porirua should be in use by the end of this year.

A new railway station with an island platform and improved access will be provided at Porirua as part of the overall scheme. A start on the new station building is expected early next year. This will be followed by a subway, and finally a road overbridge crossing motorway, railway, and Porirua Stream will be constructed to link east and west Porirua.

Additional sidings and extensions to sidings are included in the scheme, and provision is made for a goods shed to be erected at a later stage.

EAST AFRICA

Buffet Car for Tabora-Mwanza Line

The first refreshment car providing facilities for third class passengers has been introduced on the Mwanza branch of the Tanganyika Central line. It is a composite, corridor buffet car converted from a third class coach, 61 ft. long over buffers, weighing 36 tons and fitted with Timken roller bearing axle-boxes. There is upper class dining accommodation for 14 passengers at one end and a compartment with standing accommodation for a similar number of third class at the other. In the centre is the pantry, which is fitted with refrigerator, sink and so on; cooking is by an oil burning stove.

The upper class compartment is finished with blue plastic flooring, Waverite wall panelling, blue leather chairs, and grey curtains.

Tea, bread, cakes, biscuits, mineral water, cigarettes, and other articles are served to third class passengers, and considerable interest has already been shown in the experiment, which has been a success in E.A.R. & H. trains in Kenya and Uganda.

MEXICO

Proposed Monorail for Mexico City

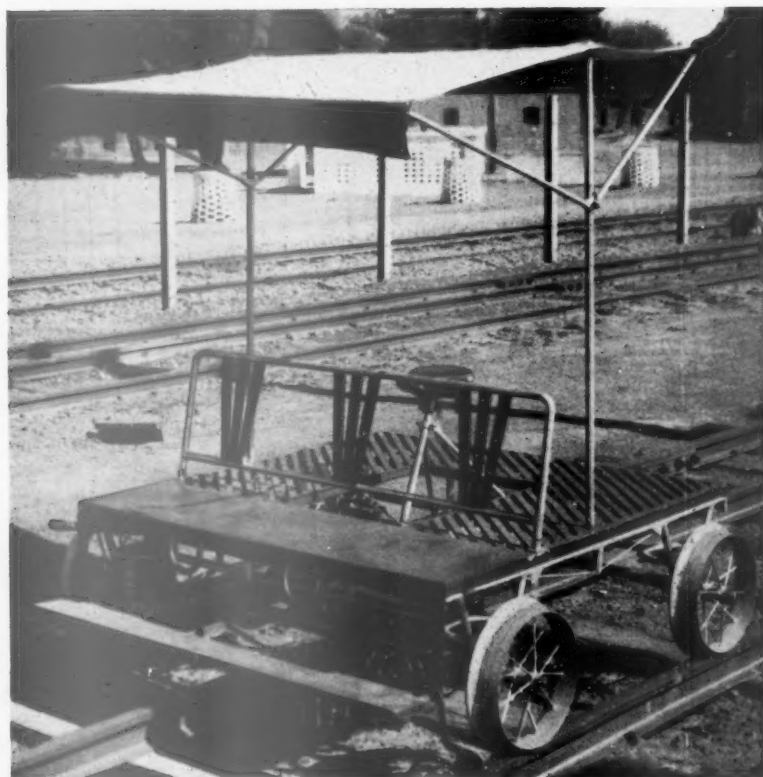
It is reported from Mexico City that the city authorities are giving consideration to a proposal made by Mr. Wenner Gren, the originator of the Alweg monorail system, that an Alweg line should be built between the city and a new industrial suburb being planned for some 200,000 inhabitants.

UNITED STATES

New C.N.W. Access to St. Louis

By the purchase of 88 per cent of the common stock of the Litchfield & Madison, a 44-mile line south of Chicago, the Chicago & North Western Railway has obtained its own independent access to the city of St. Louis. The connection between the two lines is by means of a 192-mile freight branch of the C. & N.W. from Nelson, 104 miles west of Chicago on the main line

Indian Lightweight Cycle Inspection Trolley



Indian Railways cycle inspection trolley, 5 ft. 6 in. gauge, weight 258 lb. plus 18 lb. for canopy. An earlier model was described in our February 22 issue

to Omaha, to Benld, 38 miles north of East St. Louis on the L. & M. The two railways have always worked in close conjunction, 43 per cent of the L. & M. freight business having been interchanged with the C. & N.W. at Benld. The L. & M. has paid dividends regularly since the middle 1930s, and it is expected that this acquisition, which has cost the C. & N.W. \$7,040,000, will add \$1,600,000 annually to the latter's net revenue.

ARGENTINA

Diesels for San Martín Railway

The first two units of an order for 25 1,800-h.p. General Electric diesel-electric locomotives for the General San Martín Railway arrived recently in Buenos Ayres. These will haul petroleum traffic from the Cuyo provinces and will be used also for long-distance passenger trains.

They belong to the "U.18.C" class and have the following characteristics: 1,800 h.p.; a maximum speed of 124 k.p.h.; all axles motorised; and a weight of 16 tons per axle in working order. Their high power, combined with their low weight per axle, makes them suitable for haulage over track laid with medium-weight rails.

Functions of General Railway Board

The Government has issued a decree outlining the functions of the General Railway Board, an integral part of the Ministry of Transport.

Among its principal duties will be: (1) Execution of national railway policy in accordance with the directives of the Ministry of Transport; (2) drawing

up of a plan for construction of new branches in accordance with the country's requirements from all points of view, including national defence, and taking into account the proposals of the State Railways; (3) keeping up to date of railway rules and regulations; (4) inspection and approval of new works and branches; (5) approval of new rates submitted by the State Railways; and (6) approval of labour agreements and supervision of their execution.

VENEZUELA

Lake Maracaibo Bridge

It has been announced in Germany by the Federal Foreign Minister that an agreement signed recently in Caracas provides for the construction of an 11,293-yd. bridge across Lake Maracaibo. The bridge will carry both rail and road traffic and will incorporate a moving section to allow ships to pass. The cost of the bridge and its approaches is estimated at \$34,000,000. A German-Venezuelan consortium, including Precompromido C.A. and the German firm of Julius Berger A.G. at the head of a group of German firms, is to build the new bridge.

SWITZERLAND

New Lötschberg Locomotives

The new class "Ae 8/8" 8,000 h.p. locomotives of which the first is now under construction for the Bern-Lötschberg-Simplon Railway are to be twin units of the company's existing "Ae 4/4" Bo-Bo type with multiple-

unit control, so that they can be handled by a single crew. Each of the eight axles will be driven by a 1,000 h.p. motor. The first of these locomotives is expected to be in working by the late spring of 1958, in time for the summer service. The main aim of the new class will be to permit an increase in freight train loads over the continuous 1 in 37 gradients of the Lötschberg main line, so facilitating some reduction in the frequency of the freight service, which at present, with the passenger trains, taxes to the utmost the capacity of the line between Spiez and Brigue; this is entirely single track except the 11 miles between Kandersteg and Goppenstein, through the Lötschberg Tunnel. They will also be used to avoid the double-heading of heavy passenger trains at peak periods.

FRANCE

High-Speed Pantograph Tests

Earlier this year at Dijon, the U.I.C. Office of Research & Experiments (O.R.E.) carried out in the presence of representatives from British and other European railways, a series of tests on the behaviour of various types of pantograph at speeds of at least 160 km.p.h. Among the equipment used to record the results of these tests were a slow-motion camera to film the movement of the pantograph and the oscillations of the catenary, and a number of potentiometers coupled to the contact wire to record the movements of the catenary; in addition, pedals alongside the line made possible an exact calculation of train speed.

Publications Received

Directory of Railway Officials & Year Book, 1957-58. London: Tothill Press Limited, 33, Tothill Street, Westminster, S.W.1. 8½ in. × 5½ in. 534 pp. Price 40s.—The rearrangement last year, by which all the countries in the world, other than Great Britain and Ireland, are now in alphabetical order, has been widely welcomed and is retained as a permanent feature. New features this year include enlargement of the entries for the British Transport Commission and British Railways and an article on the progress of diesel railway traction. The "Directory" is the subject of editorial comment on another page.

Indian Railways, 1955-56. New Delhi: Ministry of Railways. 162 pp. 8½ in. × 5½ in. Paper covers. No price stated.—This booklet, a statistical record, with commentary, of the year, is intended to give the general reader an account of the main features of railway operation during the year 1955-56. It covers all aspects of railway working during the period, such as financial results, operating performance and engineering aspects, and labour.

Appendices and charts give factual information relating to railway finance and performance since 1938-39.

Der öffentliche Personennahverkehr (Public Local Passenger Transport). Containing 11 sections contributed by various authors, among them Messrs. Risch and Lademann, responsible for issuing the work through Springer Verlag, Berlin (also Göttingen and Heidelberg), 20, Reichspietschstr. 463 pages, 10 in. × 6½ in. Illustrated. Price DM 67.50.—As many people concerned with public affairs needed an authoritative work from which they could learn the essentials of every aspect of local passenger transport it was resolved to produce one, with the co-operation of a number of men experienced in the several aspects. The result is this well printed and illustrated volume in which every phase of the subject is treated, in some cases at no great length yet sufficiently to enable the reader to understand leading principles and giving him references to fuller works to which he can turn. After a general theoretical introduction, prefixed by historical notes, tramways, trolley buses, ordinary buses, funiculars, cableways, and railways—with a section on rack railways—

are discussed and the economic aspect of all relating questions well treated, rates, fares and ticket systems being adequately referred to, while engineering details are made clear by numerous drawings and photographs, carefully selected. There are also some folding maps and a good index. The authors have contrived to bring together a great amount of valuable information in the compass of a single handy volume.

Railcar Progress Around the British Isles.—A 24-page booklet, fully illustrated, produced by Self-Changing Gears Limited, of Coventry, contains a great deal of information in a small space. It includes a brief account of British railcar traffic experience since 1934, technical descriptions (including composition diagrams), details of runs performed (including gradient profiles), and two route-maps covering Great Britain and Ireland. Reference is made to the measures taken by British Railways to ensure successful introduction, operation, and maintenance of railcar units, and usage on all Irish railways is summarised. Excellent service photographs are included. Copies of the booklet may be obtained from Self-Changing Gears Limited.

Electronics in a U.S.A. Marshalling Yard

Automatic devices weigh wagons, compute running characteristics, and set retarders at Gavin Yard, North Dakota



General view of yard from fifth floor of control tower

AT Minot, North Dakota, the Great Northern Railway of U.S.A. has built one of the newest and most advanced marshalling yards in the U.S.A. The yard also provides large-scale repair facilities for freight vehicles, is an important terminal for "piggy-back" operations, is a centre for the re-classification of less-than-wagonload traffic, and forms an essential link in the diesel motive power service network of the railway.

Minot has been an important centre since the St. Paul, Minneapolis & Manitoba Railway, predecessor of the Great Northern, built a station there in 1886, when the pioneer town became the railhead for the extension of the line into Montana in 1887.

Construction of a large yard in the Minot area had been under consideration for some years, and, early in 1951, planning began in earnest. A 535-acre site was purchased and, before the final plans were drawn up, careful inspection was made of modern retarder yards on other railways and their most desirable features were incorporated.

On October 19, 1954, construction of a thoroughly modern, electronically-controlled retarder yard at an overall cost of \$6,329,030 was authorised.

Strategic Location

The strategic location of Minot and of Gavin Yard on the Great Northern system can be seen by a glance at a map of the railway. The station of Surrey, at the east end of the Minot terminal, is the junction point for two principal lines eastward. Traffic to and from the Head of the Lakes (Duluth and Superior) is channelled through Grand Forks. The "Surrey

cut-off" to the south carries traffic to and from St. Paul and Minneapolis.

Furthermore, Gavin Yard is so situated as to serve both eastbound and westbound traffic. It is the farthest east terminal, for practical purposes, for classifying trains in both directions, and it is the farthest west for classifying empty trains of covered vans.

Another important factor in the choice for the location of Gavin Yard was that Minot is a federal grain inspection and sampling point, where

substantial facilities are required for the large numbers of grain cars held for inspection.

The task of grading and draining the site of the yard was started on April 15, 1955, by Megarry Brothers of St. Cloud, Minn. This called for the moving and compacting of some 1,000,000 cu. yd. of earth and the addition of another 250,000 cu. yd. of sub-ballast. The contract for erection of the yard office and control tower, wagon repair shop, freight warehouse, hump office, and locomotive inspection pit, was awarded to the Roel Construction Company of Fargo, N.D.

The principal contractor for the equipment of the yard was the General Railway Signal Company, Rochester, N.Y., which furnished signalling equipment for interlocking at yard entrances, automatic point and retarder controls, electric retarders, track switches, signals, relays, and control equipment.

Gavin Yard, with all its extensive structures and facilities, was designed in the Engineering Department of the railway. The planning and most of the installation of communication and signal facilities was accomplished by the railway's Signal and Communications Departments. Great Northern staff also erected numerous utility structures and laid all rails in the yard.

The principal buildings are a five-storey, brick-faced yard office and control tower, a 102 x 600-ft. warehouse, a 144 x 300-ft. wagon repair shop, and a hump office. Other important facilities include a diesel service and inspec-



Yard office building and control tower. The wagons in the foreground are running through one of the five electronically-controlled retarders



Retarder office on fourth floor of tower. The operator can modify any retarder action with the controls in front of him and control points as required from the console on his right

tion area, a "piggy-back" ramp and a wagon cleaning and wash-out area.

In the three-mile length of the yard there are 56 miles of track with a working capacity of 3,445 wagons. It includes a six-track combination reception and departure yard with a capacity of 895 wagons; a 27-track yard, used exclusively for marshalling, with a capacity of 887 wagons; a three-track departure yard, capacity 441 wagons; an eight-track holding yard, capacity 593 wagons; two cripple roads, capacity 115 wagons; four wagon repair tracks, capacity 230 wagons; and two hump tracks, capacity 300 wagons.

The versatile communications system includes two-way radio, paging and talk-back loudspeakers, automatic telephones, teleprinters, and pneumatic tubes.

Operation

Gavin is an electronic retarder yard, equipped with the latest radar-controlled snubbing or rail-braking devices which slow down the movement of a wagon running from the hump so that it enters the proper track at a safe coupling speed.

A freight train newly arrived in the reception yard is inspected at once. If any wagons needing repairs are found they are routed to repair tracks.

The wagons are pushed by diesel locomotives up the 14-ft. hump and are again thoroughly checked by inspectors both below and on either side of the track. An automatic journal lubricator oils every journal box.

At the crest of the hump a shunter releases wagons in rakes of 1-5 vehicles in accordance with a list made up before the train's arrival from a train formation sheet sent by teleprinter from Williston, Grand Forks, or

Breckenridge. Seated at a push-button console in the hump office, the hump foreman electronically aligns points to send the wagons to the proper track.

The wagon rolling down the 1 in 25 gradient from the crest of the hump attains a speed of some 10 m.p.h. before reaching the master retarder. Here, the wagon is electronically weighed and a radar "eye" transmits data on the speed of the wagon to a computer at the yard office. Other complex "rollability" factors such as wind velocity and direction—as well as the distance the wagon is required to travel—are computed almost instantaneously and translated into braking action at the master retarder.

Further slowing of the wagon is accomplished in a similar manner at one of four group retarders. If necessary, an operator in the control tower can exercise manual control over the retarding action.

With one hump locomotive working, the electronic retarders will deal with 100 wagons an hour around the clock, or 2,400 wagons a day. By using two locomotives during peak traffic, the rate of marshalling can be stepped up to 150 wagons per hour, or 3,600 wagons per day.

By centralising the work of marshalling freight trains at a modern yard, the Great Northern expects to increase efficiency of operation. The movement of traffic will be expedited throughout the length of the railway because of the reduction and elimination of marshalling delays at other points. Electronic control of coupling speed is expected to reduce loss and damage claims. Modern wagon repair and cleaning facilities will result in a faster and more satisfactory upgrading of freight wagons. Perhaps one of the most important contributions which Gavin Yard promises is a substantial saving in delays to wagons. A conservative estimate of that saving is 61,150 wagon-days a year—a vital item in times of wagon shortage.

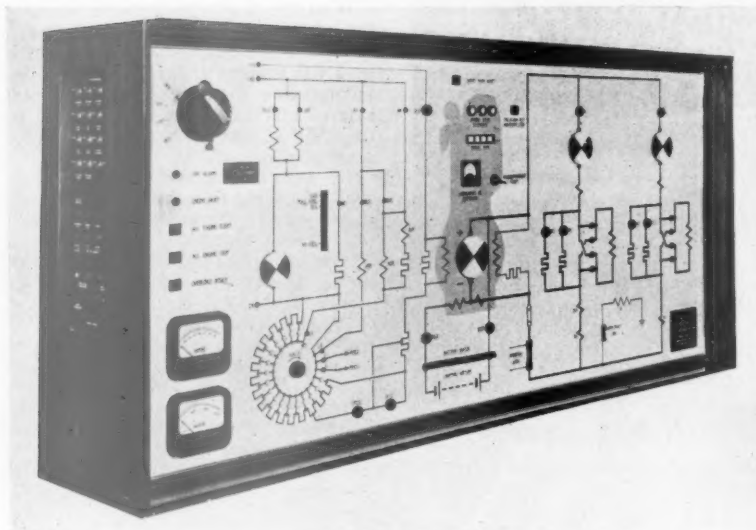
WITHDRAWAL OF PASSENGER TRAIN SERVICES FROM METHLEY NORTH.—A proposal to withdraw passenger train services from Methley North Station, North Eastern Region, has been approved by the Transport Users' Consultative Committee for the Yorkshire Area and takes effect from September 16. Alternative facilities for passengers are available either at Methley South or Woodlesford. Frequent bus services are operated by the West Riding Automobile Co. Ltd., and South Yorkshire Motors Limited. Parcels traffic will be dealt with in future at Woodlesford Station.



Box wagon passing over master retarder to group retarders beyond. All retarder movements are calculated by a computer and automatically controlled

Training Diesel-Electric Maintenance Staff

Use by British Railways, Southern Region, of operation simulator and other aids



Demonstration panel used in the training of diesel-electric fitters

AS the new types of motive power are delivered in increasing quantities to British Railways, the problem of providing competently trained maintenance staff in adequate numbers becomes greater. Training schemes are being put into operation generally on a Regional basis. The Southern Region already has in commission an instruction train described in our issue of October 26, 1956, for electric rolling stock maintenance staff. In accordance with its policy of giving comprehensive training to all maintenance staff, the Chief Mechanical & Electrical Engineer's Department has formulated a training programme for the tuition of both electric and diesel-electric maintenance fitters grades I and II. Special reference is being made, at present, to the maintenance staff for the six-car diesel-electric sets operating on the London-Hastings line via Tunbridge Wells, described in our issue of May 10, and the two-car sets for lines in Hampshire, which were the subject of editorial comment in our August 9 issue.

With the extension of electrification and the increasing use of diesel traction, the demand for staff trained in electric and diesel-electric maintenance is such that the Region estimates that training of staff for new schemes will continue for some 10 years. At present training is being undertaken at London Bridge, but more permanent accommodation is being planned.

From experience gained with main-line diesel-electric locomotives it became apparent that fitters working on diesel-electric equipments needed a more technical background than is

absolutely essential for straight electric and, in addition, a fair knowledge of the operation of the diesel engine. This need arises because of the close connection between the engine and the characteristics of the electrical equipment when loss of power occurs.

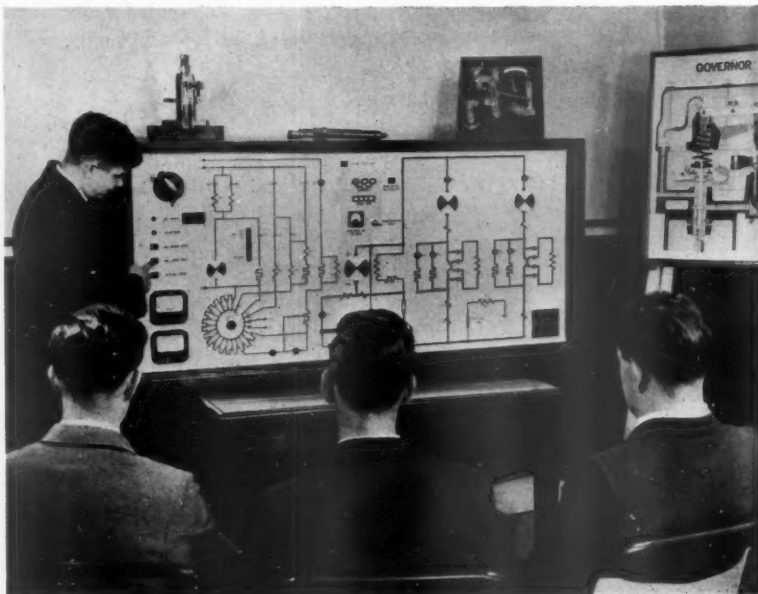
It was decided that instruction should commence with the fundamentals of electricity, because, first, some of the trainees would be non-electrical; and

second, even with experienced electrical fitters a sound knowledge of fundamentals cannot be relied on and to achieve the standard intended, a sound basic knowledge was considered essential. It was further decided that the instruction should go up to the level of an understanding of machine characteristics, avoiding as far as possible a mathematical approach. The highest level reached in arithmetic is that necessary to competently handle Ohm's Law problems.

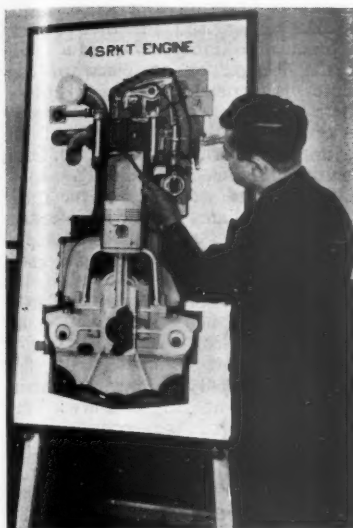
Purposes of Course

On the engine side, the aim is to present the fundamentals, and to go into considerable detail on the parts and operation of the engine fitted in the Southern Region diesel-electric multiple-unit trains. On the electrical side, lecture room experiments are carried out to prove various laws and demonstrate the use of instruments for circuit checking and fault finding.

Non-engine trainees present a more difficult problem, as running maintenance is carried out by the Motive Power Department and overhaul work is done in another Region. However, it has been possible for these men to visit a shunting locomotive at Brighton Works to examine the engine and witness load testing. Visits to manufacturers' works and various railway sheds are arranged to substantiate the limited practical work facilities in the school, and to give the trainees some experience of working on the actual equipment they will maintain.



Load control and traction circuits being explained by means of the operation simulator



Coloured cross-section drawing of diesel engine

It was decided to adopt as far as possible a method of instruction developed by the War Office for the instruction of corresponding age group classes based on a visual and psychological approach. Stencilled lecture notes for each lecture are issued, space being left for the trainees to take down any relevant drawings or diagrams. In the case of complicated drawings, duplicated prints are given.

The present syllabus includes the study of the molecular theory and basic calculations of electric circuits, magnetism, electro-magnets, action and construction of generators and motors, torque control, batteries, and schematic diagrams of train circuits, including the brake system, besides the action of compression ignition engines and auxiliaries, with particular reference to the 500-h.p. 4SRKT engine.

Wherever possible the lecture notes are supplemented by printed literature published by manufacturers, and representatives of these companies have been requested to give lectures on their particular equipments.

Equipment used for the purpose of lecture room instruction includes cut-away sectioned models of actual components, such as an injector, fuel pump, engine governor and electric power contactor, and coloured diagrams and drawings designed to illustrate the construction of larger items, such as the diesel engine. Some of these items are illustrated.

Operation Simulator

A further piece of training equipment, a demonstration unit, the operation simulator, designed and built by the Region, simulates the complex action of the load control equipment on the diesel-electric sets.

The presentation face of the unit, which can be clearly seen in the illustration, bears a schematic diagram of the

load control circuits and the traction circuits with rotating discs to represent armatures of machines and coloured lamps in the place of relay and contactor contacts.

The circuits of the unit are arranged so that the relevant lights are switched on when the relay or contactor has operated. In addition, the presentation face bears an outline of the engine and main generator and grouped on or around the outline are all the controls to be found on the engine or in the engine room. The left-hand side of the demonstration face is given over to the controls and indicators found in the cab of the parent equipment, including a traction ammeter and a speedometer. In all cases the controls and indicators produce the same effect as on the parent equipment.

The left-hand end of the case carries a fault switch panel. This panel is out of sight of anyone viewing the presentation face and by use of any fault switch the correct symptoms appear on the demonstration face.

Fuel Control

One function which is not normally visible on the parent unit is indicated on the demonstration face; this is the movement of the fuel racks. It is necessary to indicate this movement in order to clearly explain load control. Also, the indication of the engine r.p.m. given, does not appear on the full-size equipment.

The master controller switch is operated by two handles which are interlocked in the same way as the master switch and main control handle of the parent equipment. A removable master key is required to unlock the master switch and the same key is used to operate the heater stand-by switch.

The relays used to simulate the various contactors and relays of the parent equipment, and those used in the

control circuits of the unit itself are all of the Post Office type. The traction motor and main generator armature discs on the display face are driven by separate motors and the motor speeds are varied to produce a moderately realistic appearance of speed to suit the conditions prevailing on the demonstration face. The rack control unit as its name implies is the engine governor of the equipment, and is used to give a visual indication of the rack movement and also to simulate the operation of the governor switches on the parent equipment.

This unit can take up any one of nine positions: shut down; idling; four positions corresponding to the first four running notches on the master controller handle; and full fuel, under fuel and over fuel, the three governor switch positions for load control. The motor driving the unit can be operated at two speeds, one of which gives rapid movement to indicate sudden changes of load on the engine and a very slow speed to simulate the gradual loss of load as the train speed increases. Once the master controller handle is moved to a load control notch, an automatic circuit is brought into operation to move the rack control unit continually between full fuel and under fuel so that the load regulator circuit is correctly operated. The automatic circuit can be interrupted by an acceleration hold button on the fault switch panel, to enable the demonstrator to discuss the sequence of events. In addition, a manual loading (deceleration) button is provided to simulate the effect of a rising gradient. This button takes the rack control unit up to over fuel and holds the position until the button is released, it therefore, requires intelligent use since it is possible to make the apparent gradient so steep that the speedometer reading will fall to zero.



One of the items used for instruction, cut-away to facilitate tuition in construction and operation

The meter/motor unit is used to control the traction ammeter and speedometer readings and also to control the speed of the traction motor armature discs on the presentation face; this unit is the true traction motor of the simulator. The circuits are arranged so that reasonably accurate speed/load curves are obtained on each notch, and also to produce a correctly shaped but somewhat accelerated speed/time curve. The unit is arranged to reach 75 m.p.h. in 4 to 5 min. and the braking time to standstill from 75 m.p.h. is 1 min.

Apparent Wheel Slip

This unit is additionally equipped with an overnotching feature so that if the master controller is opened too rapidly apparent wheel-slip occurs, and if the controller is opened too far the traction motor overloads trip.

Theoretically, the simulator shows level tangent track conditions at all times except when coasting or when the manual loading button is used. When the master controller handle is moved to "off," the traction motor

armatures continue to rotate and the speedometer maintains its reading, simulating coasting down a gradient sufficient to maintain the train speed, until the brake button is pressed at which time the speed drops to zero at a braking rate of 1.25 m.p.h. per sec.

The fault switches include a manual overload trip to simulate fault conditions in the traction motors and also an engine overspeed trip; both of these faults can be rectified by the correct action of equipment on the demonstration face. The remaining fault switches produce the effect of various miniature circuit breakers found on the parent equipment, fire in the engine room, operation of engine protection devices, and one or two other possible defects.

Training Period

The normal duration of the classroom training for diesel-electric fitters is 14 weeks, which compares with the eight-week corresponding period of tuition for electric stock personnel. This is for trainees who already have

railway engineering experience. After the classroom period, a further 12 weeks in practical training either in a works of the Region or an electrical contractor, is planned. During this phase, fitters who have a mechanical (steam) background, as is the case of the majority, are trained in the different techniques of electrical fitting.

The type of work which the fitters will tackle includes routine maintenance and repairs of the scope of an inspection shed, for example the replacement of burnt out cabling and conduit, and emergency work, such as would be necessitated by the failure of a multiple-unit set in service.

Although staff trained in the first course were sent to the new maintenance shed at St. Leonards West Marina, those of the second course, now nearing completion, will be sent to the new depot under construction at Eastleigh where they will be engaged on similar maintenance duties on the new two-car diesel-electric train sets, which will be shortly introduced in the Hampshire area.

Rebuilding of Ravi Bridge, N.W.R. of Pakistan

Mild-steel through-type spans, with considerable weight saving

SITUATED on the Khanewal-Shorkot Road line of the North Western Railway, the Abdul Hakim bridge, consisting of four 90-ft. and one 100-ft. single-track spans, was recently reconstructed. The difference in weight between the old wrought-iron pony truss spans, which were too weak for modern traffic, and the new mild-steel through-type spans designed to carry M.L. (22½-ton axles) loading is remarkable.

Old and New Spans

The old spans consisted of single system Warren truss girders strengthened by a doubling up of the web system and the addition of steel sections to the

chords. The depth of the trusses over chords was only 8 ft. 6½ in. and the weight of the 100-ft. span 148 tons. In the new spans, the depth over chords of the single system mild-steel Warren trusses is 22 ft. 3 in. and the weight of the 100-ft. span is only 78.6 tons including the knuckle and roller bearings.

The new spans were designed and the erection scheme was worked out in the Bridge Office at the headquarters of the North Western Railway at Lahore. The steelwork was fabricated in that railway's bridge workshops at Jhelum. Reconstruction was carried out during 3-hr. occupations of the single line.

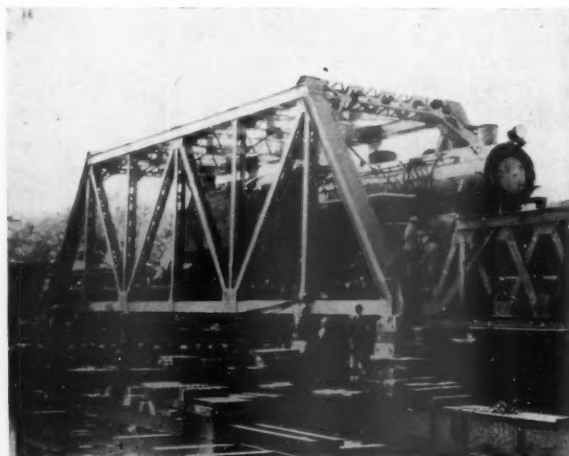
To accommodate the new spans,

which are wider than the old ones, the brickwork of the piers and abutments had to be corbelled out 2 ft. and topped by reinforced concrete caps 30 in. thick.

The new girders after assembly on camber jacks near the bridge, were lifted and transported by two 25-ton bridge erecting cranes and placed on interchangeable trestling on timber piles on the upstream side of the bridge where the new spans were completed. Similar trestling was erected on the downstream side to receive the old spans as they were rolled out pending breaking down for removal. The new spans were rolled in during the same 3-hr. occupation as the old were traversed out.



Transporting a 90-ft. girder with two 25-ton cranes on to falsework where the span was erected



A 2-8-2 "CWD" locomotive on span after its being rolled transversely into position

Comparison Between Steel and Aluminium Passenger Vehicles—2*

Improved life of bearings, wheels and bodies through reduced weight of coaches

ALTHOUGH both the motor drive bearings and the load of journal bearings are affected by weight reduction, the possible saving in life of drive bearings has been omitted as a negligible factor for consideration due to the bearing cost. The analysis of the weight effect on bearings is therefore confined to the journal bearings of which there are 16 bearings per coach.

Utilising the general antifriction bearing formula

$$l = \left(\frac{c}{p}\right) \frac{10}{3}$$

where l = bearing life in millions of revolutions, c = constant for bearing assembly, and p = effective dynamic load, it can be shown that for aluminium cars l equals 1.68 times that for the steel vehicles.

For the Toronto steel underground stock, minimum bearing life l transposed into car miles, is approximately 150,000 miles. Average bearing life is generally assumed as five times the minimum or B.10 life, which thus represents 750,000 car miles.

From the calculation therefore, the journal bearings on the aluminium cars would be expected to have an average life of $1.68 \times 750,000 = 1,260,000$ car miles.

If it is assumed that R = bearing cost, the coach miles per year are 55,000 and number of bearings per coach is 16, then the annual bearing saving per year per vehicle is 0.47R.

Factual data is not yet available because of the short service life to compare with the theoretical figure so that the theoretical figure only is used in subsequent evaluation.

Brake Shoe Life

Within the normal operating speed limit of 50 m.p.h. on the line, the maximum kinetic energy for an 83,670 lb. steel coach with its maximum loading of 31,000 lb. (222 passengers) is determined from the normal kinetic energy formula. This results in a kinetic energy value of 960,000 ft. lb. per sec. or 60,000 ft. lb. per sec. per shoe.

Within this range of work per shoe, experiments conducted at the University of Illinois Experimental Station have indicated that the relationship of brake shoe wear, in terms of lb. per 100,000,000 ft. lb. of work, approximates to a linear relation to the average rate at which braking is done. This is shown in Fig. 3, which refers to a Diamond "S" brake shoe.

From this relationship it can be derived that brake shoe wear varies directly as the square of the vehicle weight for a vehicle equipped with cast iron brake shoes. It would be expected

therefore, that in the aluminium coaches cast iron brake shoe life should be increased by the square of the ratio of vehicle weight. Assuming a 10,000-lb. passenger load in each case, the calculated brake shoe life of aluminium coaches is 1.24 times the brake shoe life of steel vehicles.

Actual tests during 1955 and 1956 show that the average brake shoe life of aluminium coaches was 7,550 miles per shoe, while the average brake shoe life of steel coaches was 6,220 miles per shoe. This means that the actual brake shoe life of aluminium coaches was 1.214 times longer than the brake shoe life of steel vehicles.

The discrepancy between theoretical and actual results may be due to the assumption that the brake shoe wear varies linearly with the rate of doing work and validity of the assumption of passenger loading.

Within the test period, because of a change in service train size require-

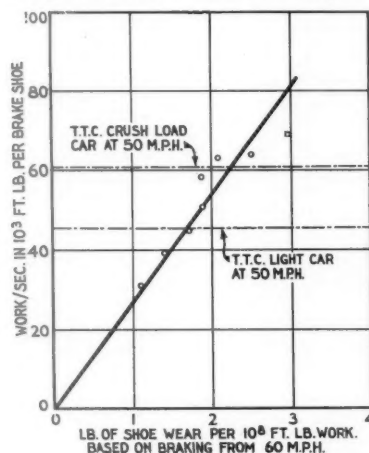


Fig. 3—Relation of brake shoe wear to work done in braking

ments, the aluminium cars were mixed indiscriminately with steel which would result in higher work requirements for the aluminium car brake shoes and hence decreased life.

For analysis, however, the agreement appears satisfactory although the "in-service" performance record will be used to compare savings. From the "in-service" record, therefore, we find a saving of 21.4 per cent. Since the Commission's average brake shoe consumption per car per year for 104 coaches is 118, the annual saving per car per year for the aluminium vehicles may be stated as

$$0.214 \times 118 \times A = 25A$$

where A represents cost per shoe.

The effect of weight reduction on wheel and track wear is difficult to

determine. Tangential shear components in propulsion, dynamic loading in motion and tangential effects of wheel and track are all effective factors in wheel and track wear.

In considering the variation in life of wheels and track work due to weight reduction it is probably safe to assume that since acceleration and braking rates are maintained constant on the steel and aluminium cars the main governing factor would be dynamic effects. For the wheel these effects are generally estimated at 100 per cent of static weight and therefore would be expected to vary directly with weight change.

It has been determined from service operation that $\frac{1}{16}$ -in. diametral wheel wear, represents 5,000 vehicle miles for the aluminium coaches and 4,400 miles for the steel coaches. This means the weight reduction due to the use of aluminium has resulted in an increase of wheel life of 13.7 per cent.

Present experience indicates wheel replacement for a steel coach to be $2\frac{1}{2}$ years or a per vehicle annual wheel replacement of 32/9 wheels per year. Assuming Z = cost of wheel, the annual replacement cost of steel wheels per coach is $32/9 Z$. For the aluminium cars, the annual saving per car is 13.7 per cent of this cost or $0.137 \times 32/9 Z$ which is 0.49 Z .

The variation in wear rate on wheels may reflect similar variations in the rate of rail wear under similar track mounting and operating conditions. With a mixed operation over common rail actual measurements are not possible. For this study no theoretical evaluation for track wear has been attempted and thus no value has been used in considering relative economies between aluminium and steel stock.

Body Maintenance

Resistance to corrosion of body components is a major factor in body maintenance. The corrosion rate in outer sheets, body posts, sills, purlings, carlines and other members is the prime factor in establishing economical vehicle life.

Protective coatings are applied to mild steel surfaces during car construction to minimise corrosion. Some of these coatings, such as exterior paint, require frequent renewal and examination to ensure the adequacy of protection.

With aluminium a choice of corrosion resistive alloys such as magnesium and magnesium silicons eliminates the necessity for protective coatings. It is possible to utilise the aluminium alloy in an unpainted condition. If colour is desired, suitable paint finishes can be obtained. The natural aluminium oxide film over which paint is applied is inert

* Part 1 appeared in our issue of August 9

and this tends to maintain adherence of the paint to the parent metal better than on mild steel sheeting.

The short "in-service" life of the underground cars has not allowed sufficient time to develop a complete picture of the relative body maintenance costs between steel and aluminium vehicles. However, on the painted steel cars, corrosion at rivet heads in certain areas has necessitated paint renewal at these sections. At present it appears that the steel coaches will require repainting after six years of service. The repainting cost would be approximately \$400.00 per coach representing a charge of approximately \$66.00 per coach per year.

Future experience may show the figure of \$66.00 to be low or high but it appears reasonable at present.

Summary and Conclusion

The saving summary, which appears in the table, indicates that the operating cost reduction obtained through the use of aluminium in construction is \$531.00 per coach per year. Not all possible savings have been included, so that the figure represents a minimum. Regarding the annual savings of power

which is given as \$278.00 it should be noted that the present Commission contract for power calls for a demand payment plus an energy charge over a 30 per cent load factor. In brief, the contract is evaluated to represent an annual charge of \$44.70 for d.c. kW. used at the car. Thus from kW.-hr. per coach mile and using the average schedule speed of the vehicle a kW. demand figure is obtained. This demand figure multiplied by the annual demand charge represents annual power costs. Average for a system in rush hour including turn around time is 15.56 m.p.h.

From the saving picture two pertinent facts can be drawn. First that the weight saved in construction, that is by reducing weight of a car by 10,414 lb., represents an annual saving of \$465.00 equivalent to \$0.05 per lb. of weight saved, and second that if vehicles are amortised over 30 years and money obtained at 5 per cent interest, the annual saving of \$531.00 represents the ability to pay approximately \$8,200 additional on original capital investment.

It is of interest to note that on the aluminium and steel coaches in ques-

tion, the original delivered purchase price for the aluminium cars was \$3,600 higher than the steel. Subsequent tenders for steel and aluminium vehicles increased this price difference to \$7,700. However, the performance analysis indicates the aluminium vehicle operating costs would justify these differences. It should be realised that the additional capital investment which could be justified by the annual saving is obviously a direct function of current interest rate and would of course have to be considered at the time of vehicle purchase.

It should be noted that the weight and body maintenance savings attributed to the use of aluminium coaches are not specifically confined to vehicles constructed with this metal. An analysis could be made for stainless steels, wherein the inherent corrosion resistance and extra strength would bear similar analysis. The comparisons outlined for the Toronto Commission's aluminium and steel underground stock indicate the very considerable importance of tare or non-paying weight on a transportation vehicle.

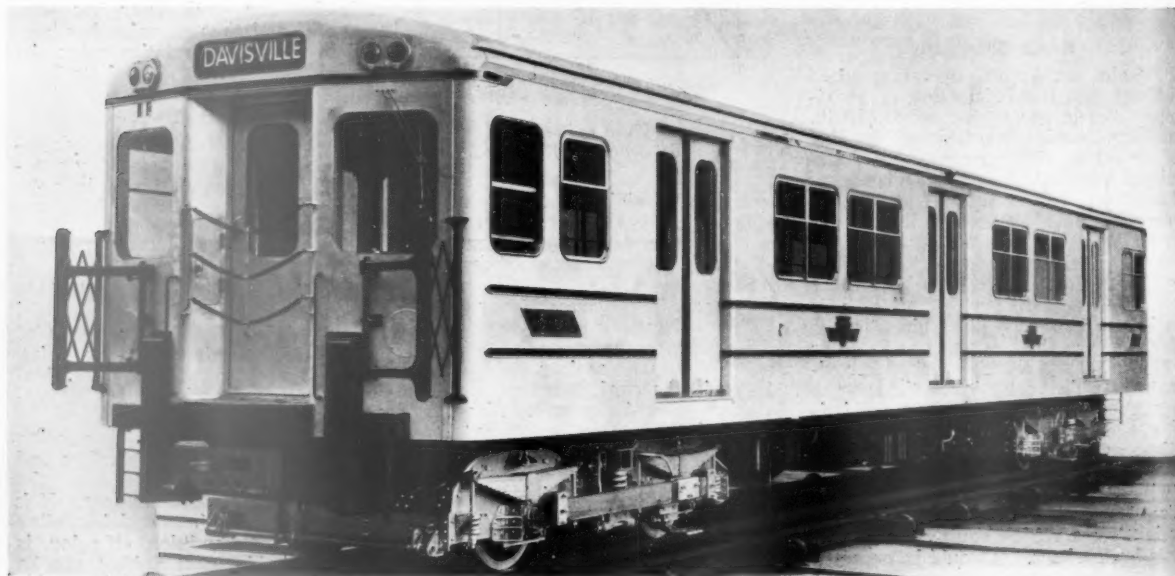
Whether weight saving is accomplished by structure redesign; the use of alloy steels, aluminium or similar metals; the obvious fact is that every pound of weight in a vehicle should be carefully scrutinised.

On the cars described, certain savings could be obtained through the use of dynamic braking, by a reduction in brake shoe and wheel costs and weight reduction in car heating equipment. These factors would of course have to be considered in any car purchase. Present experience indicates that the use of aluminium in underground car construction does result in an appreciable operating cost reduction and merits serious consideration in future.

(Concluded)

TABLE SHOWING OPERATIONAL SAVINGS OF ALUMINIUM-BUILT COACHES

Item	Savings		Factor value	Annual saving per coach in dollars
	By calculation	By measurement		
Power	—	0.40 kW.-hr. per vehicle	\$44.70 per kW.-yr.	278.00
Bearings	0.47 R	—	R = 59.00	28.00
Brake shoes	—	25 A	A = 4.37	109.00
Wheels	—	0.49 Z	Z = 102.00	50.00
Sub-total of savings due to weight reduction				465.00
Body maintenance ..	\$66.00	—	—	66.00
Total of all savings				531.00



Lightweight car for Toronto Transit Commission referred to in the article

RAILWAY NEWS SECTION

PERSONAL

Sir Brian Robertson, Chairman of the British Transport Commission, leaves by sea for New York on September 20 on a tour of the United States and Canada. He will study rail and road transport developments in those countries, and will visit, in the U.S.A., Philadelphia, Baltimore, Washington, Pittsburgh, Chicago and Cleveland, and in Canada, Toronto and Montreal. Sir Brian

at Headquarters (1931), New Works Assistant (1937), Indoor Assistant (1943), Signalling Assistant (1944), Divisional Signal & Telegraph Engineer, Manchester (1946), and Assistant Signal & Telegraph Engineer, Euston (February, 1948). He was appointed Signal Engineer, London Midland Region, on July 1, 1948. Mr. Williams was President of the Institution of Railway Signal Engineers for 1951-52. During the 1914-18 war he served overseas with the Royal

1940-44 he was responsible for the restoration of signalling and communications after aerial attack. From 1932 to 1936 he was lecturer in mechanical and electrical engineering at York Technical College and, in 1939-40, collaborated in the preparation of the textbook "Railway Signalling and Communications." In 1946 he was appointed Assistant to Engineer (Signals), Edinburgh, L.N.E.R., and, in 1947, Assistant Chief Engineer (Signals). On nationalisation



Mr. S. Williams
Signal Engineer, London Midland
Region, British Railways, 1948-57



Mr. E. G. Brentnall
Appointed Signal Engineer of the
London Midland Region

Robertson will be accompanied by Mr. T. H. Summerson, Member, B.T.C., and Chairman, North Eastern Area Board; Major-General G. N. Russell, Chairman, British Road Services, and Member, Eastern Area Board; Mr. J. Ratter, Technical Adviser, B.T.C., and Mr. H. A. Short, General Manager, North Eastern Region, British Railways. The programme will include discussions with many of the Presidents of the principal American and Canadian railways, and visits to railway installations.

Mr. Sydney Williams, M.I.R.S.E., Signal Engineer, London Midland Region, British Railways, who, as recorded in our August 30 issue, retired at the end of August, had served the railways for 51½ years. Mr. Williams began his career at Crewe in the same Department of which he later became the Chief. He was Signal Assistant to the Divisional Signal & Telegraph Engineer, Derby, in 1929, Development Assistant (Outdoor) to Signal & Telegraph Engineer

Artillery, was mentioned in dispatches and attained the rank of Captain. In 1920, he was loaned to the Ministry of Transport for 18 months.

Mr. E. G. Brentnall, M.Eng., M.I.E.E., A.M.I.C.E., A.M.I.Mech.E., M.I.R.S.E., Assistant Signal Engineering Officer, British Railways Central Staff, British Transport Commission, who, as recorded in our August 30 issue, has been appointed Signal Engineer of the London Midland Region of British Railways, was educated at Heanor Grammar School and Sheffield University, where he graduated with first class honours. In 1924 he joined the L.N.E.R. as Assistant in the Sheffield District Engineer's office. In 1926 he became Assistant in the Signal & Telegraph Engineer's office and, in 1929, Electrical Assistant to the Signal & Telegraph Engineer, North Eastern Area. In 1936 Mr. Brentnall transferred to the Southern Area, L.N.E.R., subsequently becoming Chief Technical Assistant, Outdoor Assistant, and Chief Assistant (Signals). During

he joined the London Midland Region as Divisional Signal & Telegraph Engineer, Manchester, and, in 1948, was appointed Assistant Signal & Telegraph Engineer which position, later re-designated Assistant Signal Engineer, he vacated on being appointed to British Railways Central Staff. Since 1949 he has been British Railways' Representative for Signalling & Telecommunications on the U.I.C. and was Chairman of a Sub-Committee dealing with the preparation of a Vocabulary of Signalling Terms in English, French, German, and Italian. Mr. Brentnall was the leader of the party of British Transport Commission officers which visited Ceylon from August to October, 1955, to advise on steps to improve the efficiency of the Ceylon Government Railways. In 1956 he was a member of the party of officers of the Ministry of Transport & Civil Aviation and of the British Transport Commission which visited Holland, Belgium, and France in connection with level crossings and which later made recommendations for the wider use of lifting barriers and the



Mr. D. M. Howes

Appointed Assistant (Freight Services),
London Midland Region



Mr. D. G. Williams

Appointed District Engineer, Exeter,
Southern Region



The late Dr. R. W. Bailey

Consultant to Metropolitan-Vickers Electrical
Co. Ltd., 1945-57

introduction of automatically-operated half-barriers in this country. In May the same year, he escorted a party of 150 members and ladies to the Summer Meeting in Belgium of the Institution of Railway Signal Engineers, of which body he was President during 1955-56.

Mr. D. M. Howes, who, as recorded in our September 6 issue, has been appointed Assistant (Freight Services), Euston, London Midland Region, British Railways, began his railway career with the L.M.S.R. in 1935. Three years later, after gaining experience in goods and passenger work, he was appointed a Traffic Apprentice and continued training until joining H.M. Forces in 1939. During the war Mr. Howes served in Movement Control with the British Expeditionary Force and later in Sicily, Italy and Austria, attaining the rank of Lieutenant Colonel. On returning to railway service in 1946 he was appointed Yardmaster, Stafford, and, successively, Assistant to District Operating Superintendent at Nottingham, 1947; London (Western), 1950, and Birmingham (Midland) in 1951. In 1953 he became Divisional Controller Freight Services, Derby, and, in 1955, Assistant to the Chief Operating Superintendent, Scottish Region, the position he now vacates.

We regret to record the death on September 4, at the age of 70, of Mr. Geoffrey Fownes Luttrell, a director of the Great Western Railway and a member of the Board of Management from 1930 until the railways were nationalised. The funeral, which was held at St. George's Church, Dunster, on September 7, was attended by hundreds of people, many representing county and district organisations. Mr. K. W. C. Grand, General Manager of the Western Region of British Railways (also representing the Chairman of the Western Area Board, Mr. R. F. Hanks, Sir Charles Hambro, Sir James Milne, and Mr. Cyril Lloyd) and Mr. J. D. Swain, Treasurer of the Western Region, were among those present.

Mr. C. Hearnshaw, District Operating Superintendent, Gloucester (Eastgate), London Midland Region, British Railways, has been appointed District Operating Superintendent, Hull, North Eastern Region.

Mr. D. G. Williams, B.Sc., A.M.I.C.E., who, as recorded in our July 26 issue, has been appointed District Engineer, Exeter, Southern Region, British Railways, with effect from October 1, was educated at Dorking High School and the Northampton Engineering College (London University). After graduating he joined the Southern Railway in 1925 in the office of the Chief Engineer's Assistant for New Works & Bridges, Waterloo. For the next 10 years he was employed as a draughtsman and, later, engineering assistant. From 1936 to 1938 he was Assistant Resident Engineer in connection with the re-modelling of Nine Elms Goods Yard and the construction of the Motpur Park-Chessington line. From 1939 to 1944 he was Resident Engineer on the Swanley Station reconstruction and various wartime emergency schemes. In 1945 Mr. Williams returned to the New Works Engineer's Office, Waterloo, and in the following year was appointed Assistant Divisional Engineer at Brighton. He was re-designated Assistant District Engineer in 1951.

At a recent ceremony in the offices of Ranald J. Harvey & Partners, Consulting Engineers, Westminster, Mr. H. B. Blackstone was presented with a fully-equipped cocktail cabinet on the occasion of his 70th birthday. Mr. Blackstone, who is well known in Westminster, was at one time with Sir Alexander Rendel & Partners, and later joined Sir Duncan Elliot, whose practice was taken over by Mr. Ranald J. Harvey.

Viscount Cilcennin has been appointed a Director of Silentbloc Limited.

Sir John Elliot, Chairman of the London Transport Executive, left London on September 10 for Montreal to address the Annual Convention of the American Transit Association on the problems of street congestion and competition between private motoring and public transport. This is the first occasion in the Association's 75 years that a guest speaker from this country has been invited to address the Convention. While in Canada, Sir John Elliot will also visit Yonge Street Subway in Toronto. He will go on to New York to inspect the bus and subway systems of that city.

We regret to record the death on September 4 of Dr. R. W. Bailey, who retired from active duties as Consultant to the Research Department of the Metropolitan-Vickers Electrical Co. Ltd. on March 31 this year. After serving his apprenticeship with the Great Eastern Railway at Stratford, and on completion of a City & Guilds electrical engineering course, Dr. Bailey joined Metropolitan-Vickers (then British Westinghouse) as a college apprentice in 1907. He then became a lecturer in mechanical engineering at the Battersea Polytechnic, London, and, in 1912, became the first Principal of Crewe Technical Institute (now Technical College). In 1919 he returned to Metropolitan-Vickers, and took charge of the Research Department laboratory concerned with chemical, mechanical and metallurgical testing. He relinquished executive duties in 1945 to give more attention to special research and development work and to act as Consulting Research Engineer. Dr. Bailey took out some 88 British patents and was the author of 35 published papers. For his published work on the principles of design, behaviour and properties of metals at elevated temperatures, he was awarded the degree of D.Sc.(Eng.) by London University in 1936. He was also awarded the Thomas Hawksley Premium in 1929 and the Thomas Hawksley Gold Medal in 1935 by the Institution of Mechanical Engineers, of which body he had been an Associate Member since 1922. He became a full member of the Institution in 1936, Chairman of the N.W. Branch in 1941, a member of Council in 1942, and a Vice-President in 1949, and he was Chairman of the Publications & Library Committee from 1949 to 1953. He was elected President of the Institution in 1954. In 1950 he was made an Honorary Associate of the Manchester College of Technology. In the previous year he had been elected a Fellow of the Royal Society, and he served on the Society's Council during 1951-52. Dr. Bailey served on very many technical committees, and was particularly well known for his contributions to the work of committees of the British Standards Institution, the Institution of Mechanical Engineers, and the British Electrical & Allied Industries Research Association.

Mr. J. R. Strother, Assistant General Manager, Eastern Region, Canadian Pacific Railway, has been appointed General Manager, Eastern Region, of that system.

We regret to record the death, at the age of 53, of Mr. Norman Lloyd Stevenson, Chief Industrial Officer of New Zealand Railways. Mr. Stevenson was a member of a family which has given almost 170 years of railway service. His father served the railways for 40 years, his grandfather for 20 years. Mr. Stevenson's two brothers, a son and a daughter also are employed by the Railways Department. His widow is the daughter of a former chief accountant of the Department.

Mr. L. C. Lloyd has been appointed Assistant Works Superintendent (Aldenharn) in the department of the Chief Mechanical Engineer (Road Services) of the London Transport Executive. Mr. Lloyd, who is 49, served his apprenticeship at Chiswick Works, where he served until 1945 when he was employed by London Aircraft Production. From 1945 to 1948 he served with the Control Commission in Germany as Mechanical Engineering Control Officer. He re-joined London Transport in 1948 and became responsible for the Development Shops at Chiswick Works until 1956, when he was appointed Assistant to the Works Superintendent (Chiswick).

Mr. A. L. Day, M.B.E., Divisional Superintendent "C" (District & Piccadilly Lines) retired on September 7 after 51 years of service with the London Transport Executive and its predecessors. Mr. Day joined the District Railway in 1906, at the age of 14, as a cloakroom boy at Temple station. In 1926 he was appointed District Inspector in charge of booking offices on the District Line and, later the same year, Divisional Inspector. In 1938, he became Assistant District Traffic Superintendent on the Northern Line and, three years later, District Traffic Superintendent, Central Line. In 1948, he transferred to the District and Piccadilly Lines in a similar capacity. Four years later he was appointed Staff Superintendent for the whole Underground system and, in 1954, took over the position he is now vacating. Mr. Day was awarded the M.B.E. in 1950 for his part in the West Ruislip, Hainault and Epping extension. During the 1914-18 war, he enlisted as a private in the Royal Irish Fusiliers and was later commissioned in the Royal Engineers (Railway Operating Division); he eventually became officer in charge of the Woolmer Instructional Railway Military Workshops at Longmoor, Hants. He was mentioned in dispatches while serving in Salonika.

Mr. G. P. Glenister, has been appointed Assistant District Motive Power Superintendent, Colwick, Eastern Region, British Railways. He entered railway service as a Premium Apprentice at Darlington in 1935. In 1937, he was transferred to Stratford Works. A further transfer occurred in 1939 when he joined the Motive Power Department at Stratford as a fitter, and another in 1940 when he joined the Salaried Staff to become Supernumerary Running Shed Foreman at Stratford. In 1943 he was transferred to Cambridge and, the following year, promoted to be Locomotive Shedmaster at Bury St. Edmunds. Successive appointments as Locomotive Shedmaster were at South Lynn in 1944, Colchester in 1948, and Woodford Halse in 1952. In July of that year he moved to Grantham. In 1956, he became Assistant District Motive Power Superintendent, Southend (Plaistow). Later the same year he was absorbed into the

organisation of the Line Traffic Manager, London, Tilbury & Southend Line, as Mechanical Assistant at Fenchurch Street.

Mr. F. J. Erroll, Parliamentary Secretary to the Board of Trade, is to visit Burma, Hong Kong, and China. He will leave England on September 25 by air and return about the end of October. During his tour, Mr. Erroll will explore the possibilities of increasing trade with Burma and China. He will have discussions with the governments of those countries and with the Hong Kong Government, as well as with merchants and trading organisations.

The following have been appointed to be members of the Ulster Transport Authority as from October 1: Mr. G. B. Howden (Chairman); Mr. A. G. Algeo, Mr. W. A. Edmondson, Mr. J. E. Finney, Sir Dudley McCorkell, Mr. T. G. McLaughlin, Mr. G. H. Porter, Mr. J. S. Rodgers, Mr. A. E. Swain, and Mr. J. Walker. Apart from the Chairman, members will hold office for a year. The following have been appointed members of the Great Northern Railway Board from September 1, 1957, to September 30, 1958: Mr. Howden, Mr. Algeo, Mr. J. A. Clarke, Mr. W. H. Duncan, and Mr. Porter. Mr. Howden has been designated a senior member of the board. Mr. Clarke and Mr. Duncan, respectively General Manager and Chief Accountant of the Ulster Transport Authority, replace Mr. Finney and Mr. Rodgers on the G.N.R. Board, but both continue as members of the U.T.A.

Mr. Donald Robson has been appointed Executive Director of the newly-formed Brush subsidiary, National Free Piston Power Limited. He will be responsible to Mr. B. R. Cant, General Manager of the National Gas & Oil Engine Co. Ltd. Other directors of the company are Mr. Ian T. Morrow (Chairman), who is also Managing Director of the Brush Group, Mr. C. F. Barnard, and Mr. F. Warhurst. The company was formed to market free-piston gasifiers manufactured by the National Gas & Oil Engine Co. Ltd. under Pescara/SEME/Muntz licence.

To mark the occasion of his retirement, a ceremony was held in honour of Mr. Im Obersteg, Chairman of the Anglo Overseas Transport Co. Ltd., on August 30 at Colonial House, and a presentation was made to him. Mr. Im Obersteg's successor as Chairman of the company is Mr. A. V. Packer.

Mr. G. N. Petty has joined the Brush export organisation as Area Director for the Far East and Australasia. Mr. Petty was previously Export Sales Manager for D. Napier & Sons Ltd. He has also worked for the diesel and export divisions of the English Electric Co. Ltd.

Mr. Bryce Cousens, Manager of the Mobil Oil Co. Ltd.'s Western Automotive Division since its formation two years ago, has resigned from the company to take up an executive appointment with the Standard Motor Co. Ltd. Mr. G. B. Reid, District Manager in Mobil's Southern Automotive Division in London, becomes Manager of the Western Automotive Division.

Mr. A. Frost, a Simms Overseas Service Engineer of Motor Units Limited, has just completed a 6-week tour of Finland and Sweden during which he visited over 50 operators of Simms equipment and in the course of which he travelled over 13,000 miles.

Mr. W. H. Lawrence, General Manager of Weymann Limited, has been appointed a director of Metropolitan-Cammell-Weymann Limited.

Mr. Gordon H. Holland has been appointed Manager of the Newcastle office of Furness Withy & Co. Ltd., in succession to the late Mr. P. C. Dodsworth.

Mr. Richard L. Frederick, of the U.S.A. has been appointed a director of British Timken Limited. Mr. W. R. Timken has resigned from the board owing to pressure of business in the U.S.A.

Mr. G. Smellie of the Steel Company of Wales Limited has been seconded by his company to act as Director of the British Iron & Steel Federation management courses at Asborne Hill, near Leamington Spa. Mr. H. I. Cozens has been appointed Deputy Director of the management courses.

TRANSPORT USERS' CONSULTATIVE COMMITTEE

The following members of the Transport Users' Consultative Committee have been appointed:—

Mr. S. Martin—West Midland Area (representing commerce).

Mr. T. H. Laing—South Western Area (representing agriculture).

Mr. W. Ord (reappointed), Mr. G. R. Foreman, and Mrs. C. J. Chicken—North Eastern Area (representing agriculture and shipping and appointed as an additional member respectively).

Mr. W. J. Mason (reappointed), Mr. A. V. McLeod, Councillor P. Doig—Scotland (Messrs. Mason and McLeod to represent industry and Councillor Doig to represent local authorities).

Councillor Peter Francis—East Anglia Area (representing travelling public).

THE INSTITUTION OF CIVIL ENGINEERS COUNCIL 1957-58

President

Sir Arthur Whitaker.

Vice-Presidents

Professor A. J. S. Pippard, Mr. A. C. Hartley, Sir Herbert Manzoni, Sir George McNaughton.

Members of Council

Messrs. M. E. Adams, R. J. Ashby, J. F. A. Baker, J. A. Banks, A. Borlase (South Wales & Monmouthshire), A. J. Dickson (New Zealand),* W. E. Doran, D. K. Duff (Edinburgh & East Scotland), J. E. Dumbleton (Midlands), J. H. Durr (N. & S. Rhodesia), A. Floyd,† R. Freeman,† A. A. Fulton, F. N. Green (Southern),* J. E. Harben, M. Eng. (North Western), H. J. B. Harding, R. le Geyt Hetherington,* Sir Claude Inglis, Messrs. E. A. F. Johnston (Northern Ireland),* R. F. Legget (Canada), W. Linn (Glasgow & West of Scotland), L. F. Loder (Australia), J. C. MacGregor (India & Pakistan),* H. D. Morgan,* R. W. Mountain, T. P. de Silva Munasinghe (Ceylon),* F. J. Oliver (South Africa), Sir Leonard Owen, Messrs. J. F. Pain,* J. L. Paisley, T. A. L. Paton, I. W. Pugh (Colonies),* G. E. Scott (South Western), L. G. Smith (Northern Counties),* M. G. R. Smith, N. D. E. Stephens,* J. G. Taylor (Yorkshire), F. G. Thomas,* C. B. Townend, Sir Herbert Walker (Colonies), Messrs. G. M. Wheat (Colonies), G. A. Wilson, R. M. Wynne-Edwards.

Past-Presidents

Four to be elected by the Council in November, 1957.

* Newly-elected.

† Re-elected after an interval of one year.

NEW EQUIPMENT AND PROCESSES



Precision Dressing Slide Unit

A HIGH-PRECISION slide unit, has been added to the range of Endia grinding wheel profiling equipment. It can be applied to almost any type of grinding machine for the purpose of dressing angular faces.

The model PDS 29 is lever-operated, and has a stroke of 2 in. The frame construction of the base allows temporary clamping to angle plates or any suitable block for use on toolroom or small batch work. The unit can be also screwed and dowelled to a wedge shaped base, or any convenient support for quantity production work. Both edges of the base are machined parallel to the slide axis, and can be used for sine bar setting of angles.

Three diamond stations are provided, each in angular relationship to the slide axis so that occasional rotation of the diamond tool will generate fresh cutting edges on the diamond so that the best grinding finish can be obtained.

The unit has an overall size of 3½ in. by 6 in., and the height to the diamond in either side station is only 1½ in.

The manufacturer has facility for the

design and manufacture of bases or supports if these are needed.

Further details, including prices and delivery dates, may be obtained from Engineering Diamonds Limited, 26, Warwick Row, Coventry.

Petrol Economiser

A DEVICE for reducing the consumption of petrol-engined road vehicles is the Waymouth Automatic Mixture Control unit.

This unit, which is based on sound engineering practice, applies the well-established principles of the introduction of "extra air." By this method the carburettor is by-passed and the ratios of petrol vapour, atomised petrol and liquid petrol can be changed, compensating for excess in either direction.

The disadvantages of some devices which introduce "extra air" of bad starting and idling, poor running until the engine has warmed up, lack of power at full throttle, and the risk of burnt valves, are stated to be overcome with the Waymouth unit. This is achieved because it is temperature-controlled, not operating

until the engine is warmed up, because the extra air is cut out at or near full throttle ensuring maximum power, and is cut out when idling so that the idling adjustment is normal.

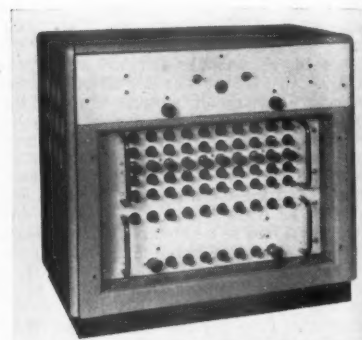
A further feature of the design is the turbulence caused by the method of introducing the air, promoting a more uniform mixture and a more even distribution to the various cylinders.

The Automatic Mixture Control unit is fitted between the carburettor and inlet manifold and is supplied ready for fitting. A small amount of final adjustment is required after fitting to the vehicle, it is stated.

The price of the unit is £5. Further details may be obtained from the distributor in this country, Fuel Conservation Limited, 132-134, Fleet Street, London, E.C.4.

Electronic Telephone Exchange

AN all-electronic private telephone exchange, the first of its kind to be developed for commercial use, is now available, and is well adapted for use in various railway installations.



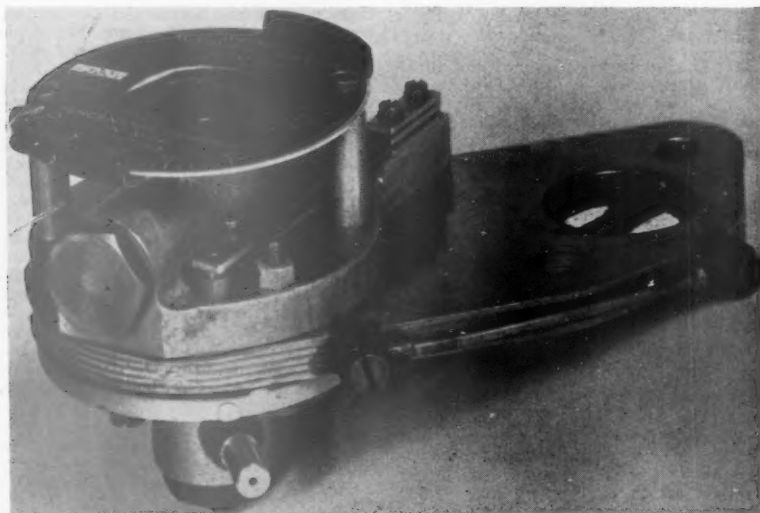
It has a capacity of 10 lines, with two circuits, and is to be followed shortly by larger versions. All the facilities of its conventional electro-mechanical equivalent are included, although it is entirely devoid of moving parts.

As it is impervious to dust, vibration, and humidity, the exchange can be located in almost any surroundings, and, with the absence of mechanical contacts and sparks, it can operate in an explosive atmosphere as in the proximity of a fuel storage depot.

The exchange incorporates a memory device which holds a call if a number is engaged, and automatically connects when the line is free.

The switching equipment consists of cold cathode tubes with a life of about 30 to 50 years. This, together with ancillary equipment, is mounted in a case 20½ in. × 19 in. × 12 in. to form the complete exchange as shown in the accompanying illustration.

The elimination of moving parts results in relatively easy performance and requires only a watching maintenance staff. It operates from 230/250 V. a.c. mains having a working voltage of 160 V. stabilised to ± 1 per cent.



Details of price and delivery can be obtained from the manufacturer, Pye Telecommunications Limited, Newmarket Road, Cambridge.

Panel Saw for Synthetic Materials

A SIZING and trimming circular saw, the WA80, now available in this country, has been developed to cut any of the wide variety of synthetic materials used for insulation and decoration, and to provide a completely clean edge. The machine will cut laminated plastic, acrylic resin sheet, Fibreglass, aluminium-faced plywood, rubber, toughened plywood and similar materials.

It is stated to be a precision instrument, all operations being controlled by adjustable stops with calibrated scales. It is enclosed in a cast iron housing and, although a heavy machine, can be easily moved if required.

Normal speeds of the WA80 are 4,800 and 6,500 r.p.m., but other speeds are available up to 10,000 r.p.m. to suit the type of materials being cut and the saw blade being used. The double-roller carriage runs accurately between dust excluding rollers. The cross slide is made of a light alloy, and can be readily suspended or removed from the body of the machine.

When trimming the workpiece is placed on the double-roller carriage and cut with a true edge. Where necessary an automatic clamping device can be provided to hold the material in position at the front whilst in the rear it is secured against lateral movement by hand pressure.

Further details can be obtained by the manufacturer, Guilliet Sons & Co. Ltd., 28-30, Rivington Street, London, E.C.2.

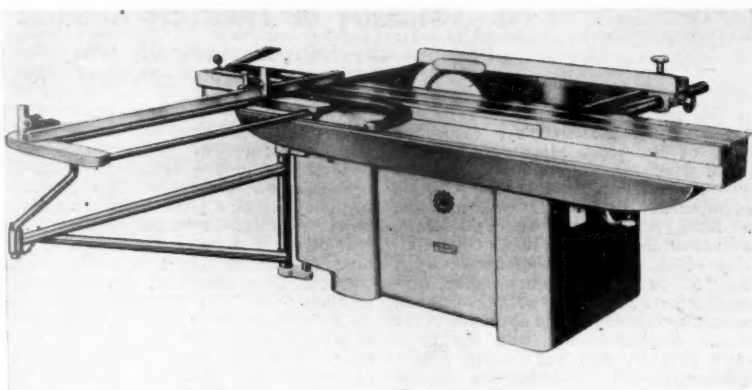
Rust Prevention Coating

AN anti-corrosion material, which is applied by brush in a cold state, is now being manufactured under the trade name Metagalv. This product, which is of application to all steelwork, steel railway wagons and coaches, and so on, is stated to confer a corrosion-resistance comparable with that obtained by hot-dip galvanising. Metagalv has a high zinc concentration, 92-95 per cent by weight, giving cathodic protection. It may be applied to adherent rust. It keys satisfactorily and converts the rust to black oxide of iron.

Normal application results in a light matt finish, and for many purposes, it is claimed, no further decorative or protective treatment is required. Metagalv may be used on surfaces subject to dry temperatures of up to 240° F. and provides a good base for any cellulose or oil-bound paint. Any desired thickness of coating can be built up by applying successive coats of the material after the previous coat is fully dry, usually about 4 hr. after application.

On smooth surfaces 32 sq. ft. can be covered per lb. in a single coat. One coat provides a primer; two coats provide a self-finish. To obtain a smooth finish, Metagalv should be given a generous coat of a suitable filling primer, and this, when thoroughly dry, should be rubbed down.

Delivery, at present, is from stock. Further details may be obtained from the manufacturer, Expandite Limited, Chase Road, London, N.W.10.



Finger Type Welding Jig

A FINGER-TYPE backing bar jig, designed to facilitate the welding of longitudinal seams in material thicknesses ranging from 0.015 to 0.1 in. has been introduced.

The clamping of the component edges is effected by means of multiple fingers on to a backing bar mounted on a cantilever mandrel. The clamping fingers, actuated by compressed air inflated hoses operating at pressures up to 50 lb. per sq. in. and giving a clamping pressure of 100 lb. per in. on either side, are controlled by foot-operated valves, and each row of fingers can be regulated individually, or together, by means of a reducing valve and air pressure gauge mounted on the machine.

The finger assembly beams are cantilevered from a vertical support which houses the counterbalance spring for the backing bar mandrel. The mandrel is therefore easily manipulated for loading and unloading the jig. The jig carries a track along one side for a self-propelled carriage and welding road, but may also incorporate a side beam carriage or lead-screw traverse attachment if desired.

The jig is designed for floor mounting through foundation bolts, and provision is made for mounting the welding head

control unit upon the vertical support.

Full details may be obtained from the manufacturer, Quasi-Arc Limited, Bilston, Staffs.

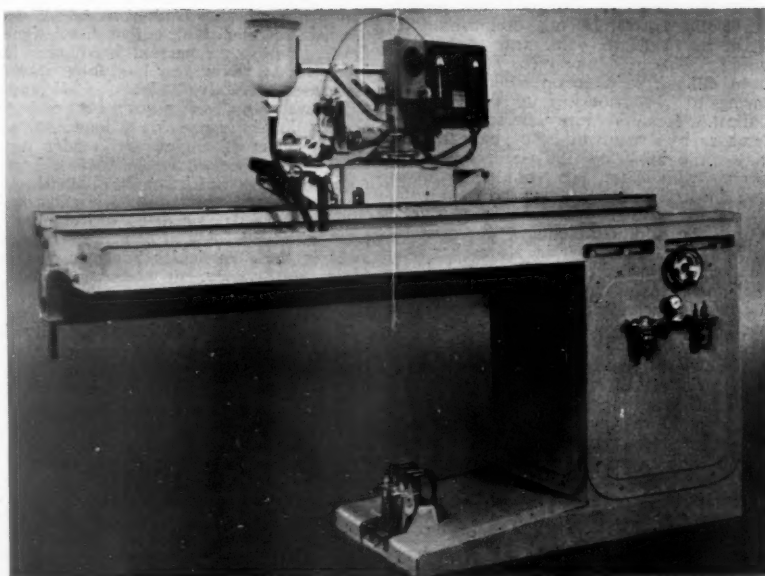
Document Surface Protection

A SYNTHETIC resin emulsion coating, Pitaplan, has been specially developed for treating all types of paper, and is intended for application to plans, blueprints, maps and other documents which require protection during handling and storage.

The material prevents permanent staining of the surface to which it is applied, allowing grease, oil, and so on, to be quickly removed by soap and water or petrol. Similarly, finger marks and dust can be easily removed by wiping the surface with a cloth.

The product protects the surface with a transparent film that bonds with the paper surface. It can be applied by brush, spray or roller, and dries in 5-10 mins.; it is unaffected by age. The cost of treating paper surfaces is estimated as less than 2d. per sq. yd.

Pitaplan is supplied in 1-gal. tins; the price is 18s. per tin. The manufacturer is Caulking Services Limited, 36, Great Queen Street, London, W.C.2.



Ministry of Transport Accident Report

Droylsden, November 22, 1956; British Railways, London Midland Region

Brigadier C. A. Langley, Inspecting Officer of Railways, Ministry of Transport & Civil Aviation, inquired into the accident which occurred at 1.8 p.m. on November 22, 1956, at Droylsden, when the 12.55 p.m. down passenger train, Manchester Exchange to Leeds City, consisting of six bogie coaches drawn by a Class "5" M.T. 4-6-0 tender engine, running at about 35 m.p.h., became derailed at a trailing crossing at the approach to the station. Engine, tender, and the three leading coaches, with the leading wheels of the fourth, left the rails and stopped in the station in 200 yd. Engine and coaches were comparatively little damaged but the track was distorted for about 200 yd. and some destroyed. The 22 passengers were uninjured. Breakdown trains were called without delay but both main lines were not open again for nearly 26 hr. and the branch to Denton, which leaves them to the right just before the station, was affected until 12.46 p.m. on November 24, because of difficulty in obtaining replacements for part of the facing junction. There was serious dislocation of traffic but buses were substituted where necessary. It was fine with dry rails.

The approach to the station from Manchester is on a gradient of 1 in 135 on a left-hand 30-ch. curve, changing to 41 ch. near the point of derailment and is crossed by two bridges, about 300 ft. apart, the second of which is just in rear of the junction points. Immediately in rear of this bridge is the crossover road concerned in the accident.

Booked timing of the train was very easy with average speed of only 24½ m.p.h. over the eight miles in rear of the station. There is a 45-m.p.h. restriction for the main line through the junction.

The Track

The down main track between the bridges had 95-lb. bull-head rails, laid in 1947, up to a rail length from the crossover, with 109-lb. flat-bottomed rail thereafter, laid in 1952. Designed cant on the curve there was 2½ in., diminishing at 1 in. in 44 ft. to ½ in. near the facing points. This particular piece of track had been difficult to maintain for many years owing to clay working up through the ballast. Repairs were effected in September by removing the ballast and replacing with ashes, but trouble continued and the line had to be repaired frequently so as to maintain the proper cant and level. An additional ganger was sent to assist the length ganger in November and on the morning of the accident had lifted the down main right-hand rail through the trailing crossing, intending to complete the work on the low after the mid-day break.

The first mark of derailment was found on the right-hand rail 7 ft. 7 in. from the toe of the trailing switch. A survey of the track in rear was made in the evening before any repairing was done and showed alignment to be good generally, but there were two rather sharp points, some 90 ft. apart, between the bridges; gauge was good, except for a length about 50 ft. from the first of these, in the direction the train was taking, where it was wide, while there was some side cutting

of the high rail but within permissible limits. Cant was satisfactory except through the trailing crossover where the men had been working and there appeared to the eye to be a good "top"; there was, however, ¼ in. excess of cant 15 ft. in rear of the first mark of derailment, running out so quickly that cant gradient was much in excess of the permissible maximum of 1 in 300, the drop being 1½ in. in the 15 ft. or 1 in 144. There were also voids up to ½ in. under the 6-ft. rail near the switch heel, but this did not materially alter the cant gradient, and another of ½ in. under the cess rail, opposite the actual crossing. Cant was corrected the day after the accident, but when Brigadier Langley checked it 10 days later it had again sunk about ½ in., near the toe of the trailing switch, giving 1 in 250 over 12 ft.

Engine and Tender

Engine and six-wheel tender were built in 1935 and had run 770,461 miles since then, 72,400 since the last general repair at Crewe in February, 1955. (The report contains, in addition to drawings of the track with voidmeter and cant readings, etc., a diagram giving all leading dimensions of the engine and other details relating to the case.) When weighed on leaving Crewe it was well balanced. Various minor repairs had been carried out, including changing the middle and trailing tender wheels in 1956 and the leading ones later in the year, when an intermediate repair had been recommended. After renewal of the leading tender wheels this was deferred until March, 1957. The theoretical wave roll was 42 ft. for the engine, 24½ ft. for the tender, at 35 m.p.h.

Tender springs were somewhat stiff and slow in responding to load removal; it is likely that actual wave roll length was longer. Very little damage was suffered in the accident and after a new spring had been fitted for the right-hand leading coupled wheel weights they were found comparatively evenly balanced, although bogie weights were somewhat out of adjustment and the trailing coupled axle carried over 1½ tons more than the designed figure. Nothing suggested locking of the intermediate draw gear and coil springs responded correctly. Weights on all tender axles were out of adjustment and all springs slow in responding to load removal. Tyre profiles of engine and tender were good and all axleboxes free in the horns with no sign of hot journals. Lateral play of leading and trailing tender axles was considerable. It was of an old class with total initial side play of ¾ in., increased by wear in these particular boxes to 1¼ and 1½ in., respectively.

Evidence

The driver, who had no difficulty in maintaining his easy schedule, said he was approaching at 25 to 30 m.p.h. when he felt an unusual bump and then others, so closed the regulator and stopped in the station. He felt no rolling or lurching before the derailment and was sure he was not travelling at high speed; he never did so through these facing points, where usually he experienced a lurch. The fireman confirmed this and the guard thought speed might have been a little higher than usual as on that day they were not booked to stop at Droylsden. He felt two lurches

and then saw they were derailed. Invariably he felt a lurch at the bridge near the junction.

The signalman also confirmed this evidence and said the 12.19 p.m. passenger train from Manchester for Stalybridge passed at about 10 m.p.h. and stopped in the station at 12.34. At 12.18 a light engine had passed at about 15 m.p.h. and at 12.13 the Liverpool-Hull express at 25. The fastest train that day had been the Newcastle express at 45 m.p.h., before work on the down line was begun.

The permanent way inspector said that when appointed to the section in October, 1955, he was warned by the District Engineer that between the two bridges was a particularly bad place, requiring constant attention. At the end of August, 1956, the clay was taken out to a depth of 6 in. below the sleepers for 170 yd., including where the derailment occurred, and replaced by ashes up to the top of them in place of stone ballast, with 15 m.p.h. speed restriction until the line was thoroughly consolidated, but still a lot of maintenance was required. On November 20 he inspected, with an acting sub-inspector and the ganger in charge, and decided that the down line through the trailing crossing should be lifted where joints had begun to go down again, but was not there when it was carried out. He was surprised to see so little damage from the accident. General condition of the track appeared satisfactory and the high rail seemed to have a good "top" but he did not check gauge or cross-levels as surveyors were doing so. A meter showed a void under the high rail near the heel of the switch and another under the low one opposite the crossing.

The acting sub-inspector said that he and the ganger brought in specially to help began work on the morning of the accident as instructed and took a first lift under the heel of the switch, raising the joint, he thought, ½ to ¾ in., with four timbers on either side. They then gave a second lift between the first one and the nose of the crossing, and raised the high rail the same amount again, completing the work about midday. He lifted the high rail by eye and did not check levels or do any work on the low rail. He was very surprised to hear that cant was nearly 1 in. too high and ran out very steeply. They were about to resume work after lunch when the accident occurred; standing between the bridges he thought the train to be travelling at 50 m.p.h., somewhat faster than others during the week.

The acting ganger who saw the derailment from near the junction diamond crossing generally confirmed this evidence.

Course of the Derailment

From various marks on wheels, etc., it seems natural to conclude that the derailment was initiated by the right-hand leading tender wheel. This first pair of wheels then became pushed further to the right after the left-hand one had struck and damaged the open switch point, leading to derailment of the entire tender and, in due course, the engine and coaches. Sufficient side pressure would be produced on the intermediate buffing gear to pull off the rear of the engine and initiate its own complete derailment. Stresses between tender and rail would be sufficient to account for the breaking of the switch

stock rail joint, bending of the leading axle and spreading of the tender frame, while the evidence of enginemen and signalman seems to confirm these views. The fireman thought the tender dropped off the line first and the driver's statement that the engine became lifted after an unusual bump is consistent with the rear coupled wheels having been pulled off by the tender.

Inspecting Officer's Conclusion

The distance travelled after derailment suggests that speed was well below the 45 m.p.h. limit; the driver was in no way responsible for the accident. The most significant feature of the case was the drop in cant mentioned, amounting to $1\frac{1}{2}$ in. in 15 ft. on the high rail, nearly twice as steep as permitted maximum, 1 in 300, a sudden drop which would have seriously reduced the weight on the right-hand leading wheel of a stiff vehicle such as the tender, with its rigid wheelbase. A roll set up by the void under the low rail, if repeated when the drop in cant was reached would still further reduce weight on the high rail at a critical moment. Although the locomotive was due for another overhaul in a few months and some wear on moving parts was to be expected its condition need not be regarded as unsatisfactory, but certain things about it would have made it respond more readily than a recently repaired engine to track irregularities. The large sideplay in the leading and trailing tender axles would have allowed it to "nose" more than usual and set up lateral flange pressures which might become dangerous when combined with reduction of wheel weight. It can be assumed, Brigadier Langley thinks, that the tender was out of balance at the moment of derailment and its right leading wheel probably considerably lighter than the left.

The many indeterminate factors in these cases make it not always possible to define with accuracy the exact causes of a derailment, but in this instance nosing may have begun on the curve between the sharp spots, combined with the little widening of gauge, and accentuated by play in the tender axleboxes. This is thought, however, not to be a material factor in the derailment, but the first void would have given the tender a roll to the left, believed to have synchronised with its natural wave roll, leading to another near the first drop in cant, probably combined with some lateral thrust. This reduced the already light weight on the wheel, which rode over the rail.

Remarks

This accident illustrates the care and skill needed for efficient permanent way maintenance. In removing one defect at this difficult place an experienced ganger created another. Instead of first carefully checking cross-levels, he lifted and levelled by eye the high rail where that was already being run out sharply on account of the reverse curve to the branch, producing an excessive cant, not noticed until the survey. Even 10 days later a low place was found not readily seen by the eye. Need for checking cross-levels has been stressed before but this case should be brought to the notice of all concerned to impress on them once again the importance of using the simple cant gauge rather than trusting to the eye to ensure level being maintained.

Deraillments have occurred from time to time where probably a cause was excessive tender axle sideplay; in this case

it was three times greater than the designed clearance of modern tenders, allowing more than usual nosing movement to develop and rendering the tender more sensitive to the quite serious track defects present. At present maximum sideplay is not specified; tenders remain running with it increasing until their engine is due for repair in other respects. With $\frac{7}{8}$ in. initial clearance it can become excessive. The Chief Mechanical & Electrical Engineer of the Region informed Brigadier Langley that clearance on the older classes of tender would be reduced to $\frac{1}{2}$ in. when next overhauled, after which the maximum should seldom exceed 1 in. The same arrangements should be made by other Regions. Uneven wheel loading probably contributed, but it is not possible to say how and when this occurred. The tender had not been weighed since leaving Crewe Works in February, 1955, but wheels had been changed since and that may have caused some maladjustment. It is desirable that engines and tenders be weighed whenever work is undertaken which might materially affect wheel loading.

New Lines in South Africa

Construction of two new lines, one as a relief line to the congested Reef area and the other to carry non-European suburban passengers in the Cape has been approved by Parliament. The new Reef line will be built between Natsalspruit and Midway, while the line in the Cape will serve as a connecting line between the Capetown-Simonstown suburban line and the Cape Flats line. Connecting stations will be Southfield and Plumstead.

Natsalspruit-Midway

Because of the anticipated increase in suburban passenger traffic on the Booyens-New Canada-Nancefield and Langlaagte-Randfontein sections it has become essential to divert from those lines goods traffic for the Western Transvaal from the Reef area and stations to the east thereof. A connecting line between Natsalspruit and Midway, $2\frac{1}{2}$ miles long, is being built.

The ruling gradient will be 1 in 100 compensated in both directions and the sharpest curve will be 20 ch. radius. The track, which will be electrified, will consist of 96-lb. rails welded in 120-ft. lengths. Three bridges, one across the Klipspruit and two flyover bridges will also have to be provided.

Southfield-Plumstead

Thousands of non-Europeans travel daily from the new native townships Langa and Nyanga to destinations such as Wynberg and Plumstead on the Cape Town-Simonstown line. With no direct connection between the Cape Flats line and the Cape Town-Simonstown line, passengers travelling over the Cape Flats line to Wynberg or Plumstead, must change at Heathfield and board another train to their destination and vice versa. With the intensive suburban train services over the Capetown-Simonstown section as heavy as they are it will become impossible eventually to cater for the increasing number of passengers from the Cape Flats line; hence the decision to build the connecting line.

The new line will be $1\frac{1}{2}$ miles long, electrified single track, laid with 120-ft. 96-lb. rails. The ruling gradient will be 1 in 80 compensated in both directions.

Wooden sleepers will be used. The platforms at Steurhof and Plumstead will be lengthened for 11-coach trains.

First Aid Training on British Railways

Many thousands of railwaymen and women throughout British Railways are now enrolling for the winter session of instruction in first aid, and more than 20,000 are expected to qualify, including some 4,000 for the first time.

First aid classes are held every year in all Regions of British Railways and classrooms, with the necessary heating and lighting, textbooks, and first aid equipment, are provided free. British Railways also pay the expenses of the doctors and qualified instructors, and give free travel to students who attend classes away from their home station.

Competitions, to raise the standard of efficiency and to foster interest, are held annually within the Regions, and between the Regions, including London Transport; there are also separate competitions for women and for British Transport Police.

Leave Concessions

To encourage even more staff to participate in the first aid movement, British Railways have improved the recognition granted to staff who qualify. One additional day's leave with pay is now granted on passing the third, instead of the fifth, and each subsequent examination, and two additional days' leave with pay on passing the fifteenth, instead of the twentieth, and each subsequent examination. A free ticket, available over any part of British Railways, will continue to be given on passing the first and subsequent examinations.

The first aid movement among railway employees began at Paddington Station in 1878, only nine months after the formation of the St. John Ambulance Association, and has steadily grown. Today, railway staff skilled in first aid are to be found in almost all grades and at most stations and depots. They perform an invaluable service as their training enables them to assist in almost any emergency, whether at their place of work, in the streets, at home, or elsewhere. There are many instances of injuries minimised and lives saved by prompt and efficient first aid work by trained railwaymen.

WESTERN WELSH OMNIBUS CO. LTD. MEETING.—At the annual meeting of the Western Welsh Omnibus Co. Ltd. recently, Mr. J. Spencer Wills, the Chairman, said that both revenue and expenses were higher in the year under review than in the previous year. The main reason for the increase in stage carriage revenue was the higher level of fares, but the acquisition of businesses from other operators also had some effect. The summer weather of 1956 compared most unfavourably with that of 1955 and the number of passengers fell by more than 3,000,000 despite increases in excursions, tours, and contract carriages. Winter evening traffic had been noticeably affected by television. The strike of busmen might mean that passengers were lost to other forms of transport, and had meant that employees, trade unions, and employers had all lost money. He called for the total abolition of the diesel fuel duty as affecting buses.

First Electronic Computer for British Railways

Paybill computations at Swindon revolutionised by new machine



Colonel A. T. Maxwell, Chairman, Powers-Samas Accounting Machines Limited, speaking at Swindon; Mr. R. F. Hanks in the centre and Mr. K. W. C. Grand on the right

The first electronic computer on British Railways, the first of its kind in the world, was officially brought into use on September 6 in the Regional Accountant's Office of the Western Region at Swindon, by Mr. R. F. Hanks, Chairman of the Western Area Board of the British Transport Commission. Mr. Hanks was accompanied by Mr. K. W. C. Grand, General Manager, Western Region, and a number of Regional Officers and guests attended.

With an ability to feed, process, and punch up to 7,200 cards an hour, this Powers-Samas computer has 100,000 live

contact points, 2,300 valves, and 300 fuses; 3,000 switches are operated by each punched card as it passes through the machine. It will revolutionise paybill compilation methods at Swindon covering the wages of 10,000 railway workers in the Locomotive and Carriage & Wagon Works.

Although the 10,000 employees receive many varying hourly rates of pay, involving flat rate, time-and-a-quarter, time-and-a-third, time-and-a-half, and double-time in the same week, the computer calculates the uplift to be applied to the hours worked according to the nature of the

overtime, multiplies the results by the hourly rates, adds in bonus and allowances, and so arrives at gross pay. Then, without any need for reference to P.A.Y.E. tables, the computer works out and deducts the income tax due, subtracts various deductions and punches net pay into the card.

The whole computation from "hours worked" to "net pay" takes only 2 sec. per employee, although it may involve 650 steps of instructions being observed by the machine and possibly 50 different calculations. The cards are then fed into tabulators which print the payslips and payroll.

Costing £20,000, the electronic computer is on rental to British Railways by Powers-Samas Accounting Machines Limited. Its use will reduce clerical staff on paybill preparation at Swindon from 100 to 60, and effect a net annual saving of £10,000. The machine shows a profit on its use for paybill preparation alone, but its application to additional fields of railway work is being studied so that the greatest possible advantage to the Region may be obtained.

In introducing Mr. R. F. Hanks, Mr. Grand stated his belief that the computer would be of immense benefit to the Western Region and to all the other Regions of British Railways when the use of computers was extended.

Higher Productivity

Mr. Hanks, after describing the computer, stated that its introduction meant savings in brain power and physical effort, and at the same time resulted in the speeding up of production. He congratulated all concerned on this piece of enterprise and teamwork.

He referred to his affection for Swindon, born of his initial training there. At Swindon a new type of express locomotive was being built which would be a great advance on anything in the world and it would take the main line in the next year.

He was convinced by the management and the railway unions that British railways were going to succeed, and this computer was one of the tools to be used to that end.

Mr. Hanks then pressed a button on the rostrum to put the computer into use.

Colonel A. T. Maxwell, Chairman of Powers-Samas Accounting Machines Limited, expressed his pleasure at being invited to Swindon.

Among those present were:—

Mr. J. W. J. Webb, Regional Accountant, Western Region; Mr. R. A. Smeddle, Chief Mechanical & Electrical Engineer; Mr. C. T. Roberts, Principal Assistant, Mechanical & Electrical Engineer; Mr. H. H. Starr, Assistant Commercial Manager (representing Mr. A. C. B. Pickford, Chief Commercial Manager); Mr. S. G. Hearn, Chief Operating Superintendent; Mr. P. Armstrong, Assistant Regional Establishment & Staff Officer (representing Mr. S. G. Ward, Regional Establishment & Staff Officer); Mr. J. D. Swain, Treasurer; Mr. H. J. Price, Public Relations Assistant (representing Mr. C. J. Rider, Public Relations & Publicity Officer); Mr. A. W. J. Dymond, Stores Superintendent; Mr. H. W. Gardner, Assistant to Regional Accountant (Rolling Stock & Stores Swindon); Mr. A. H. Curtis Welch, Secretary, Western Area Board; Mr. S. F. Cox, Assistant Regional Accountant; Mr. P. F. Grant, Senior Assistant to the Regional Accountant;

Colonel A. T. Maxwell, Chairman, and Mr. C. Shread, Special Director, Powers-Samas Accounting Machines Limited; Mr. W. J. Phillipson, Geo. Cohen Sons & Co. Ltd.; Mr. J. Laing, Central Electricity Authority; Mr. W. L. Kelly, National Coal Board; Mr. J. H. Jenkins, Nuffield Exports Limited; and Mr. E. T. Walsh, Shell-Mex & B.P. Limited



Describing the working of the computer to a member of the staff

Contracts and Tenders

Power equipments for British Railways shunters: contract for first Indian 50-cycle locomotives

The British Transport Commission announces that 546 power equipments for standard 350-h.p. 0-6-0 diesel-electric shunting locomotives have been ordered. The English Electric Co. Ltd. is to supply 506 of these equipments and the General Electric Co. Ltd. will supply 40 equipments. The mechanical parts of the locomotives will be built by British Railways. The equipments supplied by the General Electric Co. Ltd. will incorporate Lister-Blackstone 6-cylinder vertical engines.

A group of European manufacturers has obtained an order for the supply of 50 Bo-Bo 50-cycle single-phase ignitron locomotives to India. These locomotives, working on 25 kV, current and with an installed power of 2,500 h.p., are intended for use on lines of the Eastern and South Eastern Railways. The members of the group are: Ateliers de Construction Electriques de Charleroi; Allgemeine Elektrizitäts Gesellschaft; Société Générale de Constructions Electriques et Mécaniques Alstom; Brown, Boveri & Co. Ltd.; Forges & Ateliers de Construction Electriques de Jeumont; Oerlikon Engineering Company; Schneider-Westinghouse; and Siemens-Schuckertwerke A.G. The group is known as the Groupement pour les Etudes et Electrification des Chemins de fer en Monophasée 50-cycle, Löwenstrasse 35, Zurich.

The Yorkshire Engine Co. Ltd., a subsidiary of the United Steel Companies Limited, has received an order valued at about £300,000 for the supply of 12 400 h.p. "Janus" diesel-electric shunting locomotives to the Billingham Division of Imperial Chemical Industries Limited. The first two locomotives will be delivered in November, 1957, and the last is due for delivery by mid 1959. The locomotives will replace an existing fleet of steam locomotives.

Régie Nationale des Usines Renault has received from the French National Railways an order for 20 panoramic diesel-electric railcars of 925 h.p., in which 44 first class seats are to be located on an upper floor and 44 second class seats on a lower floor.

Schindler Wagons S.A., of Pratteln, Switzerland, has received from the Mexican National Railways an order for 50 mail and parcels vans. A.A.R. and buffing loads were specified and also a 12-ton maximum axleload; therefore these cars are to run on two six-wheel bogies and will have a maximum laden weight not exceeding 60 tons.

The Maschinenfabrik Esslingen and the Fried. Krupp Maschinenfabriken have together received orders for 10 miles of rack rail for the re-equipment of the Sumatra rack-and-adhesion section of the Indonesian State Railways.

British Railways, London Midland Region, have placed the following contracts:—

W. H. Heywood & Co. Ltd., Westminster, S.W.1: partial renewal of roof covering with patent glazing at Brunswick Goods Depot, Liverpool

Wellerman Bros. Ltd., Sheffield, 3: relining an air shaft in Blea Moor Tunnel, Settle and Carlisle line

L. Fairclough Limited, Adlington, Lancs: re-organisation of power supply, Birkenhead Green Lane Sub-Station, Mersey & Wirral electrified lines

Kyle Stewart (Contractors) Limited, London, N.W.6: general repairs to roofs of Smithy (Old Works) Locomotive Workshops, Crewe

Marple & Gillott Limited, Sheffield, 9: removal of track at Great Dalby, Lowesby, and Ingarsby

Edward Wood & Sons Ltd., Derby: staff accommodation, Central Electricity Authority, Repton and Willington.

The British Transport Commission, South Wales Docks, has placed the following contracts:—

J. L. Kier & Co. Ltd.: construction of new lead-in jetty, Swansea Docks

Contractor Switchgear Limited: supply and delivery of motor starting equipment, No. 1 power station, Cardiff Docks

Geo. Wimpey & Co. Ltd.: trial borings and soil investigation, new transit shed, North Dock, Newport Docks.

London Transport has placed a contract with Sanders & Forster Limited for alteration and additions to the structural steelwork of the old wood mill and sub-assemblies shop at Chiswick Works, to be carried out before the installation of the new strip-and-clean shop. This work is expected to be completed by the end of February, 1958.

The Railway Board, Government of India, proposes to purchase diesel-hydraulic and electric locomotives, boilers, and diesel-engine driven generating sets. See Official Notices on page 320.

The Director General of the India Store Department, Government Building, Bromyard Avenue, W.3, invites tenders for the supply of round steel. See Official Notices on page 320.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for a large quantity of goods wagons and brakevans, full details of which can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1), quoting reference ESB/21526/57.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from Pakistan for broad gauge wagons as follows:—

(a) TEN/27764

2,729 broad gauge (5 ft. 6 in.) four-wheel covered goods wagons "CR" type

400 broad gauge (5 ft. 6 in.) four-wheel covered cattle wagons "CMR" type

(b) TEN/27765

227 broad gauge (5 ft. 6 in.) bogie rail wagons "BR" type

50 broad gauge (5 ft. 6 in.) bogie high sided open wagons "BOC" type

40 broad gauge (5 ft. 6 in.) bogie low sided wagons "BO" type

The issuing authority is the Ministry of Communications (Railway Division). The tender No. is (a) PRS-57/WAG/3/TDR, (b) PRS-57/WAG/5/TDR. Bids should

be sent to the Joint Director (Procurement & Development), Railway Division, Ministry of Communication, Room No. 302, 2nd Floor, Secretariat Building, Adjacent Parliament House, Kings Way, Karachi. The closing date is (a) November 5, 1957, (b) November 6, 1957. Copies of the tender documents, including drawings, are available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.2). The references (a) ESB/21092/57, and (b) ESB/21093/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for a token delivery of hoops as follows:—

11,000 hoops, token delivery (circular), to N.Rly. CSTE drg. No. 761 dt. 6/3/57 (D.G.S. & D. No. 13930) and to I.R.S. specn. No. M18/50 for steel wire (hard spring steel wire) joints to be bound with wire sweated with soft solder.

The issuing authority is the Director General of Supplies and Disposals. The tender No. is WP2/18538-G/B(ii). Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is September 24, 1957. A set of tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). The reference ESB/21525 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, reports a call from India for superheater element tubes as follows:—

400 superheater element tubes Sterling type, 3rd row complete for "YP" locomotives, to R.P. & T. drg. No. ESL/216/94/D.G.S. & D. No. 12196, and I.R.S. Specn. Nos. R32/54 and R23/51. These are to C.O.S.N. Rly. indent No. 77S/1/4762/Eal./56/P1 dt. 2-4-57 (D.G.S. & D. 18143-H), Item EA1/HD-428.

Against C.O.S. W.Rly. indent No. S.428/5/21 (P1-56A) D/nil (D.G.S. & D. No. 18135-H) are required tubes, superheater elements complete, conforming to IRS Specn. Nos. R23/51 and to R32/54 as follows:—

43 4th row for "YP" locomotives (Eal/19585-4)

80 3rd row for "YP" locomotives (Eal/19585-3)

80 2nd row for "YP" locomotives (Eal/19585-2)

64 1st row for "YP" locomotives (Eal/19585-1)

These are to R.P. & T. Drg. No. E/SL/216/94 with railway noting number "B" (D.G.S. & D. No. 13279/1) letters "D," "C," "B," and "A" respectively.

The issuing authority is the Director-General of Supplies & Disposals, and the tender number is P/SW2/18143-H/1. Bids should be sent to the Director-General of Supplies & Disposals, Shahjahan Road, New Delhi. The closing date is September 26, 1957. A set of tender documents is available for loan to United Kingdom firms, in order of receipt of applications, by the Branch (Lacon House, Theobalds Road, W.C.1). The reference

ESB/21524/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, reports that the South African Railways are inviting tenders for the supply of rolled steel tyres in basic steel, class "E" quality, to S.A.R. Drawing No. S.9700 and tentative specification No. CME.T/3. Requirements are 1,000 of type "D."

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. H.6804: For Steel Tyres" should be addressed to the Chairman of the Tender Board, South African Railways, P.O. Box 7784, Johannesburg. The closing date is October 18, 1957. A copy of the tender documents, excluding drawing and specification, is available for loan to United Kingdom firms in order of receipt of applications by the Branch. A photo-copy set can be purchased from the Branch for 5s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference ESB/21678/57 should be quoted in any correspondence with the Branch (Laccon House, Theobalds Road, W.C.1).

Notes and News

Sunspots Stop Train.—Sunspots stopped a Gothenburg-Stockholm express of the Swedish State Railways early on September 5. The magnetic storms on the surface of the sun affected the electric colour-light signalling, causing a danger aspect, with the result the train was delayed for 20 min.

Accident in Jamaica.—The number of persons killed in or who have died as a result of the railway accident in

Jamaica, mentioned editorially on page 266 of last week's issue, has now been amended to 174 and not 205 as at first reported. The number of injured is impossible to ascertain, as many passengers were treated and went away without giving their names, but some estimates give figures as high as 600 or 700. It is now known that the accident occurred shortly before midnight on September 1, and not in the early hours of September 2, as appeared from preliminary reports.

Institute of Welding.—A course of ten lectures on welding, organised by the Institute of Welding, is being held at Blackfriars House, Parsonage, Manchester, 3, from October 2 to December 4. The enrolment fee for the course is three guineas, but members of the Institute of Welding and the employees of Industrial Corporate Members will be accepted at a reduced fee of two guineas. Further information on these lectures can be obtained from the secretary of the Institute, 54, Princes Gate, Exhibition Road, London, S.W.7.

Paris-Nîmes Express Derailed.—An express train from Paris to Nîmes left the rails on September 7 at Nozières-Brignon station, 14 miles from Nîmes. The locomotive, travelling at about 55 m.p.h., left the rails and fell sideways, followed by the tender, a mail van, a luggage van, and four coaches. The fifth coach was derailed but remained upright, and the two rear coaches remained on the track. The death toll was stated, as we went to press, to be 26, and 50 people were taken to hospital with injuries. A smaller number was treated for slight injuries.

London Transport Station Gardens Competition.—The small "hillside" garden at East Acton (Central Line) station has been judged to be the best London Transport station garden this year. Neatly terraced on the steep bank, the garden at East Acton is overlooked from the westbound

platform to give passengers a bird's eye view of this colourful corner. It has been laid out to take advantage of the limited space, and despite the difficult season has been a mass of colour banked round and above its central bed and grass border. Stations in the London Transport station garden contest are divided into five sections; the best garden in each section competing for the challenge cup. This year's winners in the other four sections are:—Metropolitan Line (North), Chesham; Metropolitan Line (South), Hammersmith; District and Piccadilly Lines, Arncliffe Grove; and Northern Line, Golders Green.

Higher Bus Fares.—The Northern Traffic Commissioners have granted an application by the Gateshead District Omnibus Company to increase fares on Gateshead and Felling services. These must not be put into operation until October 1, on which day a similar application from Newcastle Corporation transport undertaking, which runs some services jointly with the Gateshead company, will be heard. The Thames Valley Traction Co. Ltd. has also been given permission to raise fares.

Fire at Derby Works.—A fire at the Derby carriage and wagon works of the London Midland Region on September 10 burnt out some 320 ft. of a timber repair shop, 800 ft. in length. The shop is used for conversions and the fire is likely to have no important effect on production. Firemen from eight towns assisted the works fire brigade in fighting the fire, in which 12 coaches were destroyed and two damaged, and four containers were lost. No estimate of the damage was available as we went to press, but it is put unofficially at many thousands of pounds.

Accident on Mumbles Railway.—A two-car electric train on the Swansea & Mumbles Railway collided with a light road van on September 6, crushing the van into a space 4 ft. wide between the train and a wall. The driver of the van was trapped by the legs and sustained severe injuries. Because of danger from leaking petrol, the wreckage could not be cut away by flame cutters, and it was seven hours before the driver could be released. The Mumbles Railway began carrying passenger traffic in March, 1807, and is the oldest passenger-carrying line in the world.

Subsidence Delays London Transport Trains.—The discovery of a hole 30 ft. deep and 2 ft. wide under the London Transport lines between Cannon Street and Monument stations caused trains to be stopped for more than an hour on September 5. The hole was discovered in the early morning. London Transport engineers bridged the gap with girders and trains were allowed to proceed at not more than 5 m.p.h. Subsequent investigation showed the subsidence to have been caused by an old sewer ventilation shaft which had been sealed up when the District Line was built. The sewer concerned is nearly 30 ft. below the tracks. Although 2 ft. in width at the surface, the crack was only a few inches wide lower down.

Fast Run of Up "Caledonian."—The southbound "Caledonian" on September 5 ran from Carlisle to Euston, in the London Midland Region, 299.1 miles, in 4 hr. 14 min., arriving 37 min. early, at 2.03 instead of 2.40 p.m., after covering the distance from Glasgow Central in



Prototype London Transport light-alloy train built by the Metropolitan-Cammell Carriage & Wagon Co. Ltd. and brought into service on the Piccadilly Line last Monday; it is the first of three seven-car prototypes (see our August 16 issue)

6 hr. 3 min. Departure from Carlisle was punctual, at 10.19 a.m. Shap was passed in 55 min. from Carlisle, Preston in 86, Crewe in 155, and Kugoy in 193 min. The distance from Crewe to Euston was, therefore, covered in 119 min. The train was stopped at Eamont intermediate block signal, near Penrith, as a result of a door open on another train, and there were permanent way slacks at Bolton-le-Sands and Whitmore. The locomotive was "Coronation" class 4-6-2 No. 46244, King George VI, with a Camden crew. The load of eight coaches weighed 264 tons.

Taltal Railway Share Offer.—The board of the Taltal Railway Co. Ltd. has received an offer from Savard & Hart Limited to purchase the 240,000 £5 shares at 13s. 4½d. per share free of all expense to members. If the offer is accepted, £2,500 is to be paid to the directors for loss of office. Acceptance by not less than 90 per cent of the issued shares (or such other proportion as the purchaser may decide) by September 30, or such date as may be fixed, is a condition of the offer.

Road Accidents in 1956.—Casualties on the roads of Great Britain in 1956 showed no significant change compared with 1955. The number killed fell from 5,526 to 5,367 and the number of seriously injured from 62,106 to 61,455, but the number slightly injured rose from 200,290 to 201,138. The total number of casualties thus rose from 267,922 to 267,960. Despite a wet summer and fuel restrictions, the volume of traffic rose by 3 per cent over the year as a whole. Details of the road casualties are given in "Road Accidents, 1956," published by H.M. Stationery Office at 6s.

Wagon Loaded with Shells on Fire.—A wagon loaded with 15 14-in. naval shells caught fire in a siding at Chevington, Northumberland, on September 4. The wagon had been stopped with a hot axle-box. The fire was brought under control in time to prevent the shells exploding, but detonators exploded and a noscap from one of the shells was blown off. The wagon was man-handled into a cutting as a precaution, and main-line traffic on the East Coast route was held up for an hour. Traffic was then resumed, but passed through the station at low speed to reduce vibration.

Railway Facilities for NATO Fleet Crews.—Special facilities have been arranged for officers and men of the NATO fleet on the occasion of its visit to the Firth of Clyde on September 14, 15, and 16. There will be special trains to Glasgow on each date from Largs, Fairlie, Gourock, and Greenock Princes Pier, besides the regular services from these stations and from Helensburgh and Craigendoran. The Scottish Region has produced two descriptive booklets, one for those going ashore at Largs or Fairlie, and one for those going ashore at Helensburgh, Craigendoran, Gourock, Greenock, Dunoon, or Rothesay. Besides information on train services and fares, the booklets describe places of interest within easy reach, with suggestions for day trips, and include a map of the Firth of Clyde and Scottish Lowlands.

Oldham & Son Ltd. Report for 1956-57.—In his statement, issued with the annual report of Oldham & Son Ltd. for the year which ended March 31, last, Mr. John Oldham, the Chairman, refers to the

closing of the Suez Canal, petrol rationing, and the engineering wages dispute as three factors affecting the company's normal activities. Despite these disturbances, there were substantially improved results. The volume of sales throughout the group increased compared with the previous year. Net profit, before providing for taxation, amounted to £452,697 as compared with £398,419 in 1955-56. Total dividend for the year is again 17½ per cent. Total capital and reserves now amount to £1,548,218—without taking account of the appreciation in the value of fixed assets.

Holland Park Station Lifts to be Modernised.—The two lifts at Holland Park, London Transport Central Line, tube station, which were installed 57 years ago, are to be overhauled and modernised. Work on the first is expected to begin shortly and will take some six months. New driving machinery will be installed in the machine room below the lower landing, and power-operated gates and doors fitted to the lifts and landings.

United Automobile Services Fares to be Raised.—Permission to increase many single fares and to adjust return fares and contract and 12-journey ticket rates has been granted by the Traffic Commissioners to United Automobile Services Limited, in which the British Transport Commission holds all the shares. The fares are to be brought into line with a new fare structure granted in April, against which an appeal is pending.

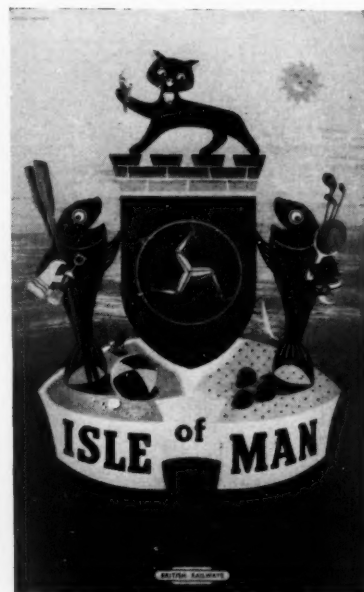
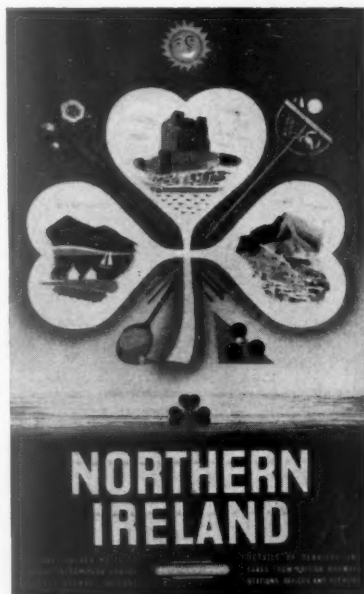
Hurst, Nelson & Co. Ltd.—In his circulated statement, Mr. A. N. Forman, Chairman, Hurst Nelson & Co. Ltd., states that despite endeavours to secure full requirements in raw materials, the company failed to obtain an adequate and co-ordinated supply to feed more than some

85 per cent of production potential. In consequence, the value of output for the year ended March 31 last fell by more than £300,000. The raw materials supply position has now improved and the short term outlook is brightened by this. The order-book assures employment of men and machines for more than a year ahead. Group trading profits fell to £59,816 from £126,866 for 1955-56, after allowing £44,749 (£39,024) for depreciation. After crediting investment income of £41,026 (£42,042) and deducting tax of £77,912 (£112,462), net profits were £19,430 (£52,946). The ordinary dividend is reduced to 7½ per cent, absorbing £17,250 (£34,500). A distribution of 5 per cent (same), not subject to tax, and a distribution of 2½ per cent (nil), not subject to tax, from dividend equalisation fund are to be paid in addition.

Station Garden Awards.—Selecting the best-kept garden in the Eastern Region annual competition is never an easy task and this year was no exception. The three judges visited 237 stations in all during their three-week tour. The six stations given special class awards were Grimston Road, Sutton Bridge, Elsenham, Dersingham, Stantsted and Staveley Central. In addition to the winners of special class awards, 43 stations won first class awards and 49 gained second class prizes.

British Travel & Holidays Association 1957 Report.—The Travel Association states in its report of the year ended March 31, that in 1956, tourist traffic was again this country's largest net American dollar-earning export. Over 270,000 visitors from the U.S.A. came to this country, their expenditure, including fare payments, totalling £46 million. Canadian visitors spent £16 million, including fares. Visitors travelled widely throughout the country, and there were

London Midland Region Publicity



New posters produced by the department of the Public Relations & Publicity Officer, London Midland Region, in conjunction with local tourist boards

reports of greater numbers going to the seaside resorts. The Association states that its constant aim is to achieve a more even flow of traffic throughout the year. "There is every hope," the report adds, "that the annual increase of between five and 10 per cent in traffic will continue, provided travel facilities are expanded and adequate promotion is undertaken."

Formation of New Brush Subsidiary Company.—Brush Group Limited has formed a subsidiary company, National Free Piston Power Limited, for marketing both at home and overseas free piston gasifiers. These units are being manufactured by the National Gas & Oil Engine Co. Ltd., under the Pescara/SEME/Muntz licence. Mr. D. Robson, formerly of Alan Muntz & Co. Ltd., has been appointed executive director of the new company, in which capacity he will be responsible to Mr. B. R. Cant, General Manager of the National Gas & Oil Engine Company. Other directors of the subsidiary are Mr. I. T. Morrow, Chairman (Managing Director of the Brush Company), Mr. C. P. Barnard, and Mr. F. Warhurst.

Railway Stock Market

Despite a moderate rally in British Funds, stock markets generally have again displayed uncertainty, partly because the reaction on Wall Street had a considerable influence on sentiment. The improvement in British Funds was due to the indications that pressure against the £ had diminished and to the belief that official support for the £ in the foreign exchange market is no longer necessary.

Business in foreign rails was again on a small scale. The trend of Wall Street was reflected by Canadian Pacifics, which receded further to \$66½, compared with \$66½ a week ago, but White Pass remained at \$19½.

Talbot Railway shares have been a feature with business up to 14s. 4½d. after the offer received by the directors to purchase the shares at 13s. 4½d. free of all expenses to shareholders. A liquidation estimate is that net assets would approximate £152,000, or 12s. 8d. a share. Hence, the board say, they unhesitatingly recommend the offer.

Costa Rica second debentures have changed hands up to 90. Brazil Railway bonds were around 5½, and in other directions, Mexican Central debentures gained a point at 70. San Paulo Railway units remained at 2s. 6d. and United of Havana second income stock was 90.

There were small mixed movements in shares of locomotive builders and engineers, though North British Locomotive, after their recent rise, reacted sharply to 15s. 3d., which compares with 17s. a week ago. Charles Roberts 5s. shares at 10s. 6d. were virtually the same as a week ago, as were Wagon Repairs 5s. shares at 12s. 10½d. and Gloucester Wagon 10s. shares kept at 15s.

Vickers changed hands around 39s. 3d. after the market talk that news may be imminent of a big new issue, which, it is assumed, will take the form of a rights offer to shareholders. Elsewhere, Associated Electrical have been steady at 62s. x.d., with General Electric 46s. 9d. and English Electric 61s., while Crompton Parkinson 5s. shares gained a few pence at 16s. 6d. T. W. Ward eased to 77s., but elsewhere, G. & J. Weir strengthened to 38s.

Dowty Group shares held steady at 34s.

and Pressed Steel 5s. shares were 16s. 6d. George Cohen 5s. shares kept steady at 13s. x.d. on further consideration of the financial results, and Babcock & Wilcox at 73s. 3d. were virtually the same as a week ago. Despite the favourable yield and general expectations that the dividend will be maintained, British Oxygen shares eased to 36s. British Aluminium were 56s. 3d. and the new shares, which are 30s. paid, changed hands around 29s. 9d.; because the set-back on Wall Street affected sentiment, underwriters have had to take up 20 per cent of the recent share issue.

Ruston & Hornsby held steady at 30s. 6d. with Ransomes & Marles 5s. shares 13s. 6d. and British Timken 68s. 10½d. There were small irregular movements in steel shares with United Steel at 20s. 10½d. and Stewarts & Lloyds 24s. 3d.

Forthcoming Meetings

Open currently and until further notice.—

British Transport Commission: Historical Exhibition "Transport Treasures" in Shareholders' Meeting Room, Euston Station, from 10 a.m. to 6 p.m. on weekdays, and 2 to 6 p.m. on Sundays. Admission 6d.

September 13 (Fri.) to September 16 (Mon.).—Institute of Transport, Weekend at Ashridge, Berkhamsted, Herts. Course on "Problems of Management in Transport."

September 14 (Sat.).—Permanent Way Institution, London Section. Joint visit to Dublin with Irish Section members.

September 19 (Thu.).—Model Railway Club, at Caxton Hall, Westminster, S.W.1, at 7.45 p.m. Film show arranged by Mr. N. S. Eagles with the co-operation of the British Transport Commission.

September 21 (Sat.).—Permanent Way Institution, Manchester & Liverpool Section, at the Technical College, Morningside Road, Southport, at 2.30 p.m. Film: "Steel Road."

September 23 (Mon.).—Historical Model Railway Society, at the Headquarters of the Stephenson Locomotive Society, 32, Russell Road, London, W.14, at 7 p.m. Talk on "The North London Railway," by Mr. A. P. Hancox.

September 25 (Wed.).—Permanent Way Institution, London Section, at the Headquarters of the British Transport Commission, 222, Marylebone Road, London, N.W.1, at 6.30 p.m. Illustrated paper on "Some impressions of urban railways and technical developments in Germany, Russia and Sweden," by Mr. C. E. Dunton.

September 25 (Wed.).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1, at 5.30 p.m. Delivery of Presidential Address by Mr. E. S. Cox.

September 25 (Wed.).—East Indian Railway Officers' annual dinner, at the Connaught Rooms, Great Queen Street, W.C.2, at 6.30 for 7 p.m.

September 26 (Thu.).—East Indian Railway re-union tea party for officers and their families, at the St. Ermins Hotel, Caxton Street, S.W.1, from 3.30 to 6 p.m.

September 28 (Sat.) to October 2 (Wed.).—Railway Students' Association, annual convention at Aberdeen.

OFFICIAL NOTICES

NOTICE. CUSTOMS REQUIREMENTS. Traffic between Great Britain and the Republic of Ireland (Merchandise and Live Stock by Goods and Passenger Services). The British and Irish Railway Undertakings and Cross Channel Shipping Companies hereby give notice that the Charges for Customs Clearance Services on traffic between places in Great Britain and places in the Republic of Ireland will be amended on and from 1st October, 1957. (Details will be supplied on application.)

THE Nigerian Railway Corporation invites applications for the following post: **SENIOR DRAUGHTSMAN (Track)** (Capital Works). Salary: £1,150 by £50 to £1450 p.a. plus £300 overseas pay, on contract with 20% gratuity p.a. of total pay. Qualifications: Candidates should have had extensive experience in the design and preparation of working drawings for track layouts and detailing Railway installations. They must be capable of making a permanent way survey. Preference will be given to candidates with experience in the New Works or Permanent Way Section of a first class Railway or with a manufacturing firm, which supplies railway components. Tours: 15 months' tours followed by 15 weeks' leave in U.K. on full pay. Allowances: In addition there are attractive allowances. Send postcard mentioning this paper for further particulars and application form to: The London Representative, Nigerian Railway Corporation, 11, Manchester Square, London, W.1.

DIVISIONAL TRANSPORT MANAGER required by West Midlands Coal Board. A Transport Manager is required by the West Midlands Divisional Coal Board in their Marketing Department. Location will be at the Divisional/Regional Sales Office in Dudley. Salary will be within the range £1,560-£2,275. Duties include responsibility for general liaison with British Railways concerning rail services to 48 collieries; management of a fleet of over 500 road vehicles engaged on various types of haulage; advising and preparing reports on road, rail and canal transport matters. A wise experience in the operational control and maintenance of vehicles employed on different types of haulage; familiarity with costing and revenue in relation to a large fleet of commercial vehicles; a sound knowledge of the wages structure for and conditions of employment of road transport operatives and of the responsibilities of operators under the various Road and Rail Transport Acts are essential. Associate membership of the Institute of Transport would be an advantage. Applications, quoting K.G. on forms obtainable from the Divisional Chief Staff Officer, West Midlands Divisional Coal Board, Himeley Hall, Dudley, Worcs, by September 27th, 1957.

THE Proprietors of Patent No. 710,809, for "Device for Electric Rail Brakes," desire to secure commercial exploitation by licence or otherwise in the United Kingdom. Replies to Haxton Lane & Co., 24, Southampton Buildings, Chancery Lane, London, W.C.2.

THE Director General of India Store Department, Government Building, Bromyard Avenue, Acton, London, W.3, invites tenders for the supply of: **ROUNDS STEEL**, 35/40 tons P.S.I., 4,500 long tons, 1 in. dia.; 1,100 long tons, ½ in. dia.; 1,700 long tons, ¾ in. dia. Forms of tender may be obtained from the above address on or after 13th September, 1957, at a fee of 10s. which is not returnable. If payment is made by cheque, it should please be made payable to "High Commissioner for India." Tenders are to be delivered by 2 p.m. on Thursday, 10th September, 1957. Please quote Reference No. 50/57/RLY.

PROGRAMME of Rolling Stock G.P.12 1957-58. The Railway Board, Government of India propose to obtain from established and reliable manufacturers the items of Rolling Stock and other Railway Equipment shown in the list below. Manufacturers in Europe, the United Kingdom and North America can obtain further details of design specifications, etc., from the Director General, India Store Department, Government Building, Bromyard Avenue, Acton, London, W.3, at a price of 3s. (particular specification applicable to each item, extra), quoting Ref. S.1545/57/CDN/FD. Offers should reach the Director, Railway Stores, State Entry Road, New Delhi, India, not later than: (a) 23rd November, 1957, for Items No. 1, 3, and 4; (b) 14th December, 1957, for Items No. 2 and 5, and manufacturers in other countries and authorised agents in India of all foreign manufacturers can obtain these particulars from the Joint Director (C & W), Research Design & Standardisation Organisation, Baroda House, Annexe, New Delhi, on or after 26th August, 1957, at a cost of Rs.2/-. List of Rolling Stock and other Railway Equipment: (1) LOCOMOTIVES: (a) and (b) 106 Nos. B.G. Diesel Hydraulic Shunting 650 or 400 H.P. (2) 7 Nos. Electric Locomotives 1,500 volts D.C. BOILERS: (3) 6 Nos. M.G. PIS type Boilers. (4) 4 Nos. N.G. (2 ft. 6 in.) "ZE" Class Boilers. (5) DIESEL GENERATING SETS: 98 sets Diesel Engine Driven D.C. generating sets.

BOUND VOLUMES.—We can arrange for readers' copies to be bound in full cloth at a charge of 25s. per volume, post free. Send your copies to the SUBSCRIPTION DEPARTMENT, Tothill Press, Limited, 33, Tothill Street, London, S.W.1.

affic
of
and
way
men
oma
reat
be
tails

pli-
OR
ary;
pay,
sive
king
way
g a
to
or
way
by
: In
card
and
ive,
are,

ired
port
onal
tion
in
275.
with
col-
cles
and
port
trol
rent
enue
cles;
and
ives
the
tial.
port
RG,
Staff
ard,
7th,

for
to
her-
ttine
cery

ement-
ton,
of ;
ons,
ons,
the
at a
it is
able
e to
ber,

-58-
ndia
able
ther
anu-
orth
peci-
store
nue,
cular
oting
the
New
957,
957,
ther
reign
the
ard-
New
it of
way
Nos.
H.P.
D.C.
ilers:
icisel

ders'
arge
s to
ited,